



## SEQUENCE LISTING

<110> Hahn, Beatrice  
Gao, Feng  
Shaw, George

<120> REFERENCE CLONES FOR NON-SUBTYPE B ISOLATES OF HUMAN  
IMMUNODEFICIENCY VIRUS TYPE 1

<130> 3532-4000

<140> TBA

<141> 1998-11-02

<160> 108

<170> PatentIn Ver. 2.0

<210> 1

<211> 8968

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR020; 133..1611:gag; 4369.4947:vif;  
4887.5177:vpr; 5158.7767:tat; 5297.7957:rev;  
5396.5641:vpu; 5559.8099:env; 8101.8727:nef

<400> 1

ctgaaagcga aagtaaacca gagaagaact ctgcagcgag gactcggctt gctgaagtgc 60  
acacggcaag aggcgagagc ggcgactggt gattacgcca aaatttgact agcagaggct 120  
agaaggagag agatgggtgc gagagcgtca gtattaagcg ggggaaaatt agatgcttgg 180  
gaaaaaattc gggttaaggcc ggggggaaag aaaaaatata gactaaaaca tctagtatgg 240  
gcaagcaggg agctagaacg atttgcactt gatccaggcc ttctagaaac atcagaaggc 300  
tgtcgaaaaa taataggaca gttacaacca tcccttcaga caggatcaga agagctcaaa 360  
tcattatata atacaatagc agtcctctat tatgtacatc aaaaggtaga ggtaaaagac 420  
accaaggagg ctttagagaa gctagaggaa gaacaaaaca aaggtcggca aaagacacag 480  
caagcgactg ctgaaaaagg ggtcagtcaa aattacccta tagtacagaa tcttcaggga 540  
caaatggtac accagtcttt atcacctaga actttaaatg catgggtaaa ggtgatagaa 600  
gagaaggctt ttagtccaga agtaataccc atgttttcag cattatcaga agggggccact 660  
ccacaagatt taaacaccat gttaaataca gtggggggac atcaagcagc catgcaaatg 720  
ttaaagaca ccatcaatga ggaggctgca gaatgggaca gattacatcc aacacaggca 780  
ggacccatcc cccaggtca gataaggga cctaggggaa gtgatatagc tggaactact 840  
agtacccttc aggaacaaat acaatggatg acaggcaacc cacctgtccc agtgggagaa 900  
atgtataaaa gatggatcat cctaggatta aataaaatag taagaatgta tagccctgtc 960  
ggcatttttg acataagaca agggccaaaa gaacccttta gagactatgt agacaggttc 1020  
tttaaaaccc taagagctga gcaagctaca caggaagtaa agggttggat gacagacacc 1080  
ttgttggtcc aaaatgcgaa cccagattgt aagaccattt taaaagcatt gggaccaggg 1140

TO 1000 MAIL ROOM

3532-1 200

RECEIVED

gctacactag aggaaatgat gacagcatgt cagggagtgg gaggacctag ccataaggca 1200  
 agagtttttg ctgaggcaat gagccaagca acaaatacag ctataatgat gcagaaaagt 1260  
 aactttaagg gccaaagaag aattgttaaa tgctttaatt gtggcaaaga aggcacata 1320  
 gccaaaaatt gcagggcccc tagaaaaaag ggctgttgga agtgtggaag agagggacac 1380  
 caaatgaagg actgcactga gagacaggct aatttttttag ggaaaatttg gccttccaac 1440  
 aaggggaggc ccggaactt catccagaac aggccagagc cgtcagcccc gccagcagag 1500  
 agcttcaggt tcggggagga gacaacccca tctccgaagc aggagcagaa agacgaggga 1560  
 ctgtaccctc ccttagcttc cctcaaatca ctctttggca acgacccta gtcacaataa 1620  
 gagtaggggg acagctaaag gaagctctat tagatacagg agcagatgat acagtattag 1680  
 aagacgtaaa tttgccagga aaatggaaac caaaaatgat agggggaatt ggaggtttta 1740  
 tcaaagtaaa acagtatgat agcactactca tagaaatttg tggacacaga gctataggta 1800  
 cagtgttagt aggcactacg cctgtcaaca taattggaag aaatatgttg acccagattg 1860  
 gttgtacttt acattttcca attagtccta ttgagactgt accagtaaaa ttgaagccag 1920  
 gaatggatgg cccaaagggt aaacaatggc cattgacaga agaaaaata aaagcattaa 1980  
 cagaaatatg tatggaaatg gaaaaggaag gaaaaatttc aaaaattggg cctgaaaatc 2040  
 catacaatac tccagtattt gccataaaga aaaaagacag tactaaatgg aggaaattag 2100  
 tagatttcag agaacttaat aaaagaactc aagatttttg ggagggttcaa ttaggaatac 2160  
 cgcattccagc aggggttaaaa aagaaaaagt cagtaacagt actggatgtg ggggatgcat 2220  
 atttttcagt tcccttagat aaggatttca ggaagtacac tgcattccacc atacctagta 2280  
 ccaacaatga gacaccagga gttaggtacc agtacaatgt gcttcacaa ggatggaaaag 2340  
 gatcaccagc aatattccaa tatagcatga caaaaatctt agatcccttt agagcaaaaa 2400  
 atccagacat agttatctac caatacatgg atgatttgta tgtagggtct gacttagaaa 2460  
 taggacagca tagaacaaaa atagaagagt taagagaaca tctactgaaa tggggattaa 2520  
 ctacaccaga caaaaaacat caaaaagaac ccccatctct ttggatgggg tatgaactcc 2580  
 atcctgataa atggacagtg cagcctatac aattgccaga caaggacagc tggactgtca 2640  
 atgatataca gaagttagta ggaaaactaa attgggcaag tcagatttat ccagggatta 2700  
 aagtaaaaca attatgtaaa ctcccttaggg gagccaaggc actaacagac atagtgccac 2760  
 tgactacaga agcagagtta gaattggcag agaataggga gattctaaaa gaaccagtac 2820  
 atggggcata ttatgaccgg tcaaaagact taatagcaga aatacagaaa caagggcaag 2880  
 ggcaatggac atatcaaatt tatcaagagc catttaaaaa tctaaaaaca ggaaagtatg 2940  
 caaaaatgag gtctgcccac actaatgatg taaaacagtt aacagaagca gtgcaaaaaga 3000  
 tatctctaga aagcatagta atatggggca agactcctaa gtttagacta cccatattaa 3060  
 aagagacatg ggatacatgg tggacagagt actggcaagc cacctggatt cctgagtggg 3120  
 agtttgtcaa tccccccct ctagtaaaac tatgggtatca gttagaaaca gagcccatag 3180  
 taggagcaga aaccttctat gtagatgggg catctaatag agagaccaa aaaggaaaag 3240  
 caggatatgt tactgacaga ggaagacaaa aagcgtctc cctaactgag actacaaatc 3300  
 agaaggctga gttacaagca attcagttag ctttacagga ttcaggatca gaagtaaaca 3360  
 tagtaacaga ctacacagat gcattaggaa tcattcaagc acaaccagat aagagtgaat 3420  
 cagagttagt caatcaaata atagagcaat taataaaaaa ggaaaaggtc tacctgtcat 3480  
 gggtagcagc acacaaaggg attggaggaa atgaacaagt agataaatta gtcagtgtcg 3540  
 gaatcaggaa agtactgttt ctagatggga tagataaggc acaagaggaa catgaaaaat 3600  
 atcacaacaa ttggagagca atggctagtg attttaatat accagctgta gtagcaaaag 3660  
 aaatagtagc tagctgtgat aaatgtcagc taaaagggga agccatgcat ggacaagtag 3720  
 attgtagccc agggatatgg caattagatt gcacacattt agaaggaaaa attatcctgg 3780  
 tagcagtcca tgtagctagt gggtagctag aagcagaagt tatccagca gaaacaggac 3840  
 aagagacagc ctacttccta ctaaagttag caggaagatg gccagtaaaa acaatacata 3900  
 cagacaatgg caccaatttc accagtcca cggttaaggc agcttgttgg tgggcaggta 3960  
 tccagcagga atttgaatt ccttacaacc cccaaagtca aggagtagta gaatctatga 4020

ataaagagct aaagaaaatc ataggacaga taagagatca agctgaacat cttaagacag 4080  
 cagtccaaat ggcagtattc attcacaatt ttaaaagaaa aggggggatt gggggatata 4140  
 gtgcagggga aagaacaata gacataatag caacagacat acaaactaga gaattacaaa 4200  
 aacaaattat aaaaattcaa aatttccggg tttattacag ggacagcaga gaccaggttt 4260  
 ggaaaggacc agcaaagcta ctctggaaag gtgaaggggc agtagtcata caagacaata 4320  
 gtgaaataaa ggtagtcca agaagaaaag caaagatcat tagggattat ggaaaacaga 4380  
 tggcaggtga tgattgtgtg gcaggtagac aggatgagga ttaacacatg gaaaagttaa 4440  
 gtaaaatacc atatgcata ttcaaagaaa gccaaaggat ggttttatag acatcacttt 4500  
 gaaagcaggc atccaaaaat aagttcagaa gtacacatcc cactagagac agctgaatta 4560  
 gtaataacaa catactgggg gctgcttcca ggagaaagag aatggcatct gggtcaggga 4620  
 gtctccatag aatggaggca ggggaggtat agaacacaaa tagaccctgg cctggcagac 4680  
 caactgatcc atatatatta ttttgattgt ttttcagaat ctgccataag gaaagccata 4740  
 ttaggacata aaattagccc taggtgtaac tatcaagcag gacataacaa ggtaggatct 4800  
 ctacaatact tggcactaac agcattaata gctccaaaaa agacaaagcc gcctttgcct 4860  
 agtgtccaga aactagtaga agacagatgg aacaagcccc agaagaccag gggccacaga 4920  
 gagagccata caatgaatgg aactagatc ttttagagga gcttaagaat gaagctgtta 4980  
 gacattttcc taggccatgg ctccatagct taggacaaca tatctataac acctatgggg 5040  
 atacttggga aggagttgaa gcaatcataa ggatattgca acaactactg tttatccatt 5100  
 tcagaattgg gtgccgtcat agcagaatag gcattactcg acagagaaga gtaagaaatg 5160  
 gaactagtag atcctaactt agatccctgg aaccatccag gaagccagcc tacaactcct 5220  
 tgtaccagat gttattgtaa atgggtgtgc tttcattggt actggtgctt tacaacgaag 5280  
 ggcttaggca tctcctatgg caggaagaag cggagacagc gaccaagaac tcctcaaagc 5340  
 agtcagatac atcaagattt tgtaccaaag cagtaagtat tgttaagcat atgtaatgtc 5400  
 aaatttgtaa gcaataggca tagcagcatt aatagtagca ctaataataa caatagttgt 5460  
 gtggactata gcatatatag aatataagaa actggttaagg caaagaaaaa taaatagggt 5520  
 atataaaaga ataagcgaag gagcagaaga cagtggcaat gagagtgagg gggatgcaga 5580  
 ggaattggca gcacttgggg aagtggggcc ttttattcct ggggacatta ataactgtga 5640  
 atgctgcaga aaacttatgg gttacagtct attatggggg acctgtgtgg aaagaagcaa 5700  
 ccactactct attctgtgca tcagatgcta aatcatatga aaaagaggca cataatgtct 5760  
 gggctacaca tgcttgtgta cccacagatc ccaatccaca agaagtagtt ctggaaaatg 5820  
 taacagaaag gtttaatatg tgggaaaata acatggtaga acaaatgcat acagatataa 5880  
 tcagtttatg ggatcaaagc ctaaagccat gtgtgaagt aacccactc tgtgttactt 5940  
 tagattgtag aaacattgcc accaatggca ccaatgacac tattgccatc aatgacactc 6000  
 tgaaggaaga tccagaggca atacaaaact gttctttcaa tacaaccaca gaaataagag 6060  
 ataagcagct gaaagtacat gcactttttt ataaacttga tatagtacaa atcaacaagg 6120  
 atgacaatag aacatacaga ctaataaatt gtgatgcctc aaccattaca caggcttgtc 6180  
 caaaggatc ttgggatcca attcccatac attattgtgc tccagctggg tatgcgattc 6240  
 taaagtgtaa tgagaaaaat ttcacaggga cagggtcatg caagaatgtc agtacagtac 6300  
 aatgtacaca tggaattaaa ccagtggat ccactcaatt gttgttaaat ggcagcctag 6360  
 cagaaggaga gatagtaatc agatctcaa atatctcaga taatgcaaaa accataatag 6420  
 tgcaccttaa tgaatctgta cagattaatt gtacaagacc caacaacaat acaagaaaaa 6480  
 gaatatcttt aggaccagga cgagtatttt atacaacagg agaaataata ggagacatca 6540  
 gaaaggcaca ttgtaacgtt agtggaaacac aatggaggaa cacgttagca aaggtaaagg 6600  
 caaagttagg gtcttatttc cctaattgca caataaaatt taactcatcc tcaggagggg 6660  
 acctagaaat tacaaggcat aattttaatt gtatgggaga atttttctac tgtaatacag 6720  
 atgaactgtt taatgacaca aaattcaatg acacaggatt caatggcact atcactctcc 6780  
 catgtcgaat aaaacaaatt gtaaacaatg ggcaggaagt gggacgagca atgtatgcca 6840  
 atcccattgc aggaacatt acctgtaact caaatattac aggtctgcta ttgacaagag 6900

Sub  
 B1  
 cont.

atggtggtct gaatagtact aatgagacct tcagacctgg gggaggaaat atgaaagaca 6960  
 attggagaag tgaattatat aaatataaag tagtagaaat tgaaccacta ggagtagcac 7020  
 ccaccaaggc aaaaagacaa gtggtgaaga gagaaagaag agcagtggga ctaggagctc 7080  
 tgttccttgg gttcttggga gcagctggaa gcactatggg cgcggcgtca ataacgctga 7140  
 cggtagaggc cagacaatta ttgtctggaa tagtgcaaca gcagagcaat ctgctgaggg 7200  
 ctattgaagc gcaacagcat ctgttgcagc tcacagtctg gggcattaaa cagctccagg 7260  
 caagagtcct ggctgtggaa agatacctaa aggatcaaca gtcctaggg ctttggggct 7320  
 gctctggaaa actcatctgc accactaatg tgccctggaa ctctagttag agtaataaat 7380  
 ctcttgagga gatttggggg aacatgacct ggatggagtg ggaaaaagag gtttagcaatt 7440  
 actcaaaaga aatatacagg ttaattgaag actcgcagaa ccagcaggaa aagaatgaac 7500  
 aagaattatt agcattggac aaatgggcaa gtctgtggaa ttggtttgac ataacacagt 7560  
 ggctgtggta tataaaaaata ttcataatga tagtaggagg cttgataggc ttaagaatag 7620  
 tttttactgt gctttctata gtaaataagag ttaggaaggg atactcacct ttgtcatttc 7680  
 agacccatat cccaagcccg agggaaaccg acaggcccga aggaatcgaa gaaggaggtg 7740  
 gagagcaagg caaagacaga tccgtgagat tagtgaccgg attcttagct cttgcctggg 7800  
 acgacctgcg gaacctgtgc ctcttcagct accgccactt gagagacttc atattaattg 7860  
 cagcgaggat tgtggacagg gggctgaaga ggggggtggg agctctcaaa tatctgggga 7920  
 atctcacaca gtattggggg caggaactaa agaatagtgc tattagcttg cttaatgcca 7980  
 cagcaatagc agtagctgag tggacagata gagttataga agctttgcaa agagctggta 8040  
 gagctattct caacatacct agaagaataa gacagggctt ggaaagggtt ttgctataaa 8100  
 atgggtggca agtgggtcaaa aagtagtata gttggatggc ctgctataag ggaaagaatg 8160  
 aggcgaaccc ctccaacccc tccagcagca gaggggggtg gagcagtgtc tcaagactta 8220  
 gaaagacggg gggcaattac aagcagcaat actagagcta ataatcctga cttggcctgg 8280  
 ctggaagcac aagaggaaga cgaagtaggc tttccagtca gacctcaggt acctttaaga 8340  
 ccaatgacct ataagggagc tgtagatctc agtcactttt taaaagaaaa ggggggactg 8400  
 gaagggttaa ttactccaa gagaagacaa gagatccttg atctgtgggt ctaccacaca 8460  
 caaggctact tccctgattg gcagaactac acaccagggc cagggatcag atatccactg 8520  
 accatggggg ggtgcttcaa gctagtacca gttgaccag aggaggtaga aaaggccaat 8580  
 gaaggagaga acaactgctt gctacacccc atgagccaac atggaatgga ggatgaagac 8640  
 aaagaagtac tgaaatggga gtttgacagc cgcttggcac tgagacacat agccagagag 8700  
 agacatccgg agtactacca agactgagac tgctgacaca gagattgctg acacagaaga 8760  
 atctaaaggg actttccact ggggactttc cagaggggtg gccagagggc gggactgggg 8820  
 agtggctcac cctcagatgc tgcataataag cagcgcctt tcgcctgtac tgggtctctc 8880  
 tagttagacc agatttgagc ccgggagctc tctggctagc tagggaaccc actgcttaag 8940  
 cctcaataaa gcttgccctg agtgcttt 8968

<210> 2

<211> 8987

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG083; 156.362:gag; 1727.4465:pol;  
 4410.4988:vif; 4928.5218:vpr; 5199.7795:tat;  
 5338.8000:rev; 5440.5466:vpu; 5593.8142:env;  
 8144.8767:nef

<400> 2

|             |            |             |            |            |            |      |
|-------------|------------|-------------|------------|------------|------------|------|
| atgaaagcga  | aagttaatag | ggactcgaaa  | acgaaagttc | cagagaagtt | ctctcgacgc | 60   |
| aggactcggc  | ttgctgaagt | gcacacagca  | agaggcgaga | gcggcgactg | gtgagtacgc | 120  |
| cattttttga  | ctagcggagg | gctagaagga  | gagaggtggg | tgcgagagcg | tcagtattaa | 180  |
| gcgggggaaa  | attagattct | tgggaaaaaa  | ttcggttaag | gccaggggga | aggaaaaagt | 240  |
| ataaactaaa  | acatatagta | tgggcaagca  | gggaactggg | gagatttgca | cttaaccgtg | 300  |
| acctttttaga | aacagcagaa | ggttggtgtgc | aaataatgaa | acagttgcaa | ccagctctct | 360  |
| agacaggaac  | agaggagctt | agatcattat  | ttaatacagt | agcaaccctc | tactgtgtac | 420  |
| atcaaaagat  | agaggtaaaa | gacaccaaag  | aagctccaga | ggaagtggaa | aaaatacaaa | 480  |
| agaacagtca  | gcaagaaata | cagcaggcag  | caaagaatga | aggaaacagt | aaccagtc   | 540  |
| gccaaaatta  | tcctatagtg | cagaatgcac  | aaggggcaat | gatacatcag | gccatatcac | 600  |
| ctaggacttt  | gaatgcgtgg | gtaaaagtag  | tagaagaaaa | ggccttcagt | ccagaagtaa | 660  |
| tacccatgtt  | ttcagcatta | tcagagggag  | ccaccccaca | agatttaa   | accatgctaa | 720  |
| atacagtggg  | ggggcatcaa | gcagctatgc  | aaatgctaaa | ggatactatc | aatgatgaag | 780  |
| ctgcagagt   | ggacaggata | catccacagc  | aggcagggcc | tattccacca | ggccaaataa | 840  |
| gagagcctag  | tggaaagt   | atagcaggaa  | ctactagtac | cctgcaggaa | caaataagat | 900  |
| ggatgaccag  | caaccacct  | atcccagtgg  | gagaaatcta | taaaagatgg | ataatcctgg | 960  |
| gattaaataa  | aatagtgaga | atgtatagcc  | ctgtcagcat | tttggacata | agacaagggc | 1020 |
| caaaagaacc  | ctttagagat | tatgtagata  | ggttctttaa | aactttgaga | gctgagcaag | 1080 |
| ctacacagga  | agtaaaaggt | tggatgacag  | acaccttgtt | ggttcaaaat | gcgaacccag | 1140 |
| attgtaaaac  | catcttaaga | gcattaggac  | caggagctac | actagaagaa | atgatgacag | 1200 |
| catgtcaggg  | agtgggagga | cccagccata  | aagcaagagt | tttagctgag | gcaatgagcc | 1260 |
| aggcatcagg  | tgcagcagca | gcagccataa  | tgatgcagaa | aagcaatttt | aagggcccg  | 1320 |
| gaagaattat  | taagtgtttc | aactgtggca  | aggaaggaca | tctagccaga | aattgcaggg | 1380 |
| cccctaggaa  | aaagggtgt  | tggaaatgtg  | gaaaggaggg | acatcaa    | aaagaatgca | 1440 |
| cggaaaggca  | ggctaatttt | ttagggaaaa  | tttggccttc | caacaagggg | aggccaggaa | 1500 |
| actttctcca  | gaacaggaca | gagccaacag  | ccccaccagc | agagagcttc | ggattcggag | 1560 |
| aggagatagc  | cccctccccg | aagcaggagc  | caaaggagaa | ggagctatat | cccttaactt | 1620 |
| ccctcaa     | actctttggc | agcgaccct   | agtcacagta | aaaatagggg | gacagctaat | 1680 |
| agaagcccta  | ttagacacag | gagcagatga  | cacagtatta | gaaggaataa | atttaccagg | 1740 |
| aaaatggaaa  | ccaaaaatga | tagggggaat  | tggaggtttt | atcaaagtaa | gacagtatga | 1800 |
| tcaaatactt  | atagaaattg | gtggaaaaaa  | ggctataggg | acagtattag | taggacctac | 1860 |
| acctattaac  | ataattggga | gaaatatgtt  | gactcagatt | ggttgactt  | taaactttcc | 1920 |
| aataagtct   | attgaaactg | taccagtaaa  | attaaagcca | ggaatggatg | gcccagggt  | 1980 |
| taaacaatgg  | ccattgacag | aagagaaaaat | aaaagcatta | acagaaattt | gtaaagacat | 2040 |
| ggaaaaggaa  | ggaaaaat   | caaaaattgg  | gcctgaaaat | ccatataaca | ctccaatatt | 2100 |
| cgccataaag  | aaaaaagaca | gtactaaatg  | gagaaaattg | gtagatttca | gagaacttaa | 2160 |
| taaaagaact  | caagacttct | gggaggtcca  | attaggaata | cctcaccccg | cgggggttaa | 2220 |
| aaagaaaaga  | tcagtaacgg | tactagatgt  | gggagatgca | tacttttcag | ttcccttaga | 2280 |
| taaagacttt  | agaaagtata | ctgcatttac  | tatacctagt | ataaataatg | agacaccagg | 2340 |
| gattagatat  | caatacaatg | tgcttccaca  | gggatggaaa | ggatcaccag | caatatttca | 2400 |
| gagtagcatg  | acaaaaat   | tagagccttc  | tagaacaaaa | aatccagaaa | tggtgatcta | 2460 |
| ccaatacatg  | gatgatttat | atgtaggatc  | tgacttagaa | atagggcagc | atagagcaaa | 2520 |
| aatagaggag  | ttaagagaac | atctactgaa  | atggggattg | accacaccag | ataaaaaaca | 2580 |
| tcagaaaaga  | cctccattcc | tttggatggg  | atatgagctc | catcctgaca | aatggacggg | 2640 |
| acaacctata  | cagctgccag | aaaaggaaga  | ttggactgtc | aatgatatac | aaaagttagt | 2700 |
| gggaaaacta  | aattgggcaa | gtcagattta  | tccagggatt | aaagtaaagc | acctatgtag | 2760 |
| actccttagg  | ggggccaaag | cactaacaga  | catagtaccc | ctaacggcag | aagcagaaat | 2820 |
| ggagctggca  | gagaacaggg | aaattctaaa  | agaacctgta | catggagtct | atcatgaccc | 2880 |

atcaaaagaa ttaatagcag aagtacagaa gcaagggcca gaccaatgga catatcaaat 2940  
ttatcaagag ccatacaaaa atctaaaaac aggaaaatat gcaaaaaggg ggtctgcccc 3000  
cactaatgat gtaaaacaat taacagaagt agtgcaaaaa atagccacag agggcatagt 3060  
aatctgggga aagattccta aatttaaact acctatacga aaagaaacat gggaagtatg 3120  
gtggacagag tactggcagg ccgcctggat tcttgagtgg gagtttgtca ataccctcc 3180  
tctagtaaaa ctatggtatc aattagaaac agaaccata ccaggagcag aaacttacta 3240  
tgtagatggg gcagctaata gggagacaaa attaggaaag gcaggacatg ttactgacaa 3300  
aggaaaacaa aaaattatta ccctaactga aacaacaaac caaaaggctg aattacatgc 3360  
aattcaacta gctttgcagg actcaagacc agaagtaaac atagtaacag actcacagta 3420  
tgcattagga atcattcaag cacaaccaga taggagtggg tcagaattag tcaatcaaat 3480  
aatagaacag ctaataaaaa aggaaaaggt ctacctgtca tgggtaccag cacacaaagg 3540  
gattggagga aatgaacaag tagataagct agtcagtagt ggaatcagga aagtattatt 3600  
tttggatggc atagataaag cccaagaaga acatgaaaga tatcacagca attggagagc 3660  
aatggctagt gatttttaatc tgccacctgt agtagcaaaa gaaatagtgg ccagctgtga 3720  
taaagtgtcaa ctaaaagggg aagccatgca tggacaagta gactgtagtc caggaatatg 3780  
gcaattagat tgtacacatt tagaaggaaa aattatcata gtagcagttc atgtagccag 3840  
tggctatata gaagcagaag ttatcccagc agaaacaggg caggaaacag catactttat 3900  
attaaaatta gcaggaaggt ggccagtaaa agtgatacat acagacaatg gtcccaattt 3960  
catcagtgtc gcagtaaagg cagcatgttg gtgggcaaat atcacacagg aatttggaat 4020  
tccctacaat ccccaaagcc aaggagtagt ggaatctatg aataaggaat taaagaaaat 4080  
catcggacag gttggagatc aagctgaaca tcttaagaca gcagtacaga tggcagtatt 4140  
cattcacaaat tttaaaagaa aaggggggat tggggggtac agtgcagggg aaagaataat 4200  
agacataata gcatcagata taaaactaa agaactacaa aaacaaatta taaaaattca 4260  
aaattttcgg gtttattaca gggacagcag agacccaatt tggaaaggac cagcaaagct 4320  
actctggaag ggtgaagggg cagtagtaat acaggacaat aacgaaataa aggtagtacc 4380  
aagaagaaaa gcaagatcc ttaaggatta tggaaaacag atggcaggtg gtgattgtgt 4440  
ggcaggtaga caggatgagg attagaacat ggaacagttt agtaaaacat catatgtatg 4500  
tctcaaagaa agctaaaggc tggttttata gacatcacta tgaaagcagg catccaagag 4560  
taagttcaga agtacacatc ccactaagag atgctacact agtagtaaga acatattggg 4620  
gtctgcatgc aggagaaaaa gactggcaat tgggccatgg ggtttccata gaatggaggc 4680  
agaaaagata tagtacacaa atagacccta acacagcaga ccatctgatt catctgtatt 4740  
attttgactg tttttcagaa tctgccataa gaaaagccat attaggagag atagttagcc 4800  
ctaggtgtga ataccagca ggacataata aggtaggatc tctacaatat ctggcatcga 4860  
aagcattagt aacaccaaca aggaaaaggg cacctttgcc aagtgttggg aaattagcag 4920  
aagatagatg gaacaagccc cagaagacca gggaccacag agagaaccct acaatgaatg 4980  
gacattagaa ctgttagaag agcttaaaaa tgaagctgtt agacattttc ctaggccctg 5040  
gctccatggc ttaggacagt atatctataa cacttatggg gatacttggg aaggagttaga 5100  
agccataata agaatactac aacaactact gtttatccat ttcagaatcg ggtgccaaca 5160  
tagcagaata ggcattactc cacagagaag agtaaggat ggacccggtg gaccctaagc 5220  
tagagccctg gaatcatccg gggagtcagc ctacaactcc ctgtaacaaa tgttattgta 5280  
aagtgtgctg ctggcattgt caagtttgtc ttttaaacia aggcttaggc atctcctatg 5340  
gcaggaagaa gcggagaccc cgacgaggaa ctctcaggg cagtaaggat catcaaaacc 5400  
ctgtacaaa gcagtaagta gtaacaatta atatatgtaa tgcaggcctt agaaatatct 5460  
gactaatagt agcattcata gcagccacaa ttgtgtggag tatagtattt atagaatata 5520  
gaaaaataag aaaacagaaa aaaatagaaa agttacttga tagaataaga gaaagagcag 5580  
aagacagtgg aatgagagt gaaggggata cagaggaatt ggcaacactt atggaaatgg 5640  
gggactttga tccttgggtt ggtaataatt tgtagtgcct cagataactt gtgggtcaca 5700  
gtctattatg gggtacctgt gtgggaagat gcagataccc ccctattctg tgcctctgat 5760

|            |             |            |             |             |             |      |
|------------|-------------|------------|-------------|-------------|-------------|------|
| gctaaatcat | atagttctga  | aaaacataat | gtctgggcta  | cacatgcctg  | tgtacccaca  | 5820 |
| gaccctaacc | cacaagaaat  | agctatagaa | aatgtaacag  | aaaattttta  | catgtggaag  | 5880 |
| aataacatgg | tagaacagat  | gcaggaggat | ataatcagtt  | tatgggagga  | aagcctaaaag | 5940 |
| ccatgtgtaa | agctaactcc  | tctctgtatc | actttaaact  | gtactaatgt  | aaacagtgtc  | 6000 |
| aatcatactg | aggccaataa  | cactgtagaa | aacaaagaag  | aaataaaaaa  | ctgctctttc  | 6060 |
| aagataacca | cagaaagggg  | aggcaagaag | aaggaagaat  | acgcgctttt  | ctataaactt  | 6120 |
| gatgtggtac | caattagtaa  | tgggaataag | actagttata  | ggctaataca  | ttgtaatgtc  | 6180 |
| tcaaccatta | aacaggcttg  | tccaaaggta | aattttgacc  | caattcccat  | acattattgt  | 6240 |
| gctccagctg | gttttgcat   | tttaaagtgt | agggataagg  | agtacaatgg  | aacaggacca  | 6300 |
| tgtaaaaatg | tcagtacagt  | acaatgtaca | catggaatta  | agccagtggg  | atcaactcaa  | 6360 |
| ctactgctga | atggcagttt  | agcagaagaa | gatataagaa  | ttagatctga  | aaatttcaca  | 6420 |
| gacaatacca | aagtccataat | agtgcagctt | aataatagta  | tagaaattaa  | ttgtatcaga  | 6480 |
| cccaataaca | atacaagaaa  | aagtatacca | atcggaccag  | gacaagcgtt  | ctatgcaaca  | 6540 |
| ggtgatataa | taggagacat  | aagacaagca | cattgtaatg  | ttagtagaat  | aaaatggagg  | 6600 |
| gagatgttaa | agaatgtcac  | agcacagcta | aggaaaatct  | ataataataa  | gaacataacc  | 6660 |
| tttaactcat | ctgcaggagg  | ggacctagaa | attacaacac  | atagtttcaa  | ttgtagagga  | 6720 |
| gagtttttct | attgcaatac  | atcaggactg | tttaataata  | atattagtaa  | tattaataat  | 6780 |
| gagactatca | cactcccatg  | taaaataaaa | caaatttgtga | ggatgtggca  | gaaagtggga  | 6840 |
| caagcaatgt | atgcccttcc  | catcgcagga | aaccttgtat  | gtaaatcaaa  | cattacagga  | 6900 |
| ttaatattaa | caagagatgg  | tgggaataac | aatgacagta  | cagaggagac  | cttcagacct  | 6960 |
| ggaggaggag | atatgaggga  | caattggaga | agtgaattat  | ataagtataa  | aacagtaaaa  | 7020 |
| atcaaatac  | taggagtagc  | accaccagg  | gcaaggagaa  | gagtggtgga  | gagagaaaaa  | 7080 |
| agagcagttg | gactgggagc  | tgtcttcctt | gggttcttag  | gagcagcagg  | gagcactatg  | 7140 |
| ggcgcggcgt | caataacgct  | gacggcacag | gtcagacaat  | tattgtctgg  | catagtgcaa  | 7200 |
| cagcaaagca | atttgctgag  | ggctatagag | gcgagcagc   | atctgttgca  | actcacagtc  | 7260 |
| tggggcatta | aacagctcca  | gtcaagagtc | ctggctatag  | aaagatacct  | aaaggatcaa  | 7320 |
| cagctcctag | ggatttgagg  | ctgctctgga | aaactcatct  | gcaccactaa  | tgtgccctgg  | 7380 |
| aacactagtt | ggagtaataa  | atcttataat | gagatttgga  | ataacatgac  | ttggctagaa  | 7440 |
| tgggaaagg  | aaattcacia  | ttacacacaa | cacatataca  | gcctgattga  | agaatcgag   | 7500 |
| aaccagcagg | aaaagaatga  | acaagactta | ttggcattgg  | acaagtgggc  | aagtgtgtgg  | 7560 |
| aattggtttg | acatatcaaa  | ttggctatgg | tatataagaa  | tattcataat  | gatagtagga  | 7620 |
| ggtttaatag | gtttaagaat  | agtttttgct | gtgctttcta  | tagtaaatag  | agttaggcag  | 7680 |
| ggatactcac | ctttgtcggt  | ccagaccctt | acccatcacc  | agcgggaacc  | cgacaggctc  | 7740 |
| ggaaaaaccg | aagaaggagg  | tggcgagcaa | gacagagaca  | gatccactcg  | attagtgagc  | 7800 |
| ggattcttag | cgcttgccctg | ggacgacctg | cggagcctgt  | gccttttccag | ctaccaccgc  | 7860 |
| ttgagggact | tagtcttgat  | tgcagcaagg | acggtggaac  | ttctgggacg  | cagcagcctc  | 7920 |
| aagggactga | gactgggggtg | ggaaggcctc | aagtacttgt  | ggaacctcct  | gttgtattgg  | 7980 |
| ggtcggaac  | taaagaatag  | tgctattaat | ttgcttgata  | caatagcaat  | agcaacagct  | 8040 |
| aacgggacag | ataggggttat | agaagtagca | caaagagctt  | atagagctat  | tctcaacgta  | 8100 |
| cctacaagga | taagacaagg  | cttagaaaga | gctttgctat  | aaaatggggg  | gcaagtgggtc | 8160 |
| aaaaagtagc | atagttggat  | ggcctcagat | aagggaaaga  | ataagacaaa  | ctcctgtagc  | 8220 |
| agcagaagga | gtaggagcag  | tatctcaaga | tttagctagg  | catggagcaa  | tcacaagcag  | 8280 |
| caatacagca | accaacaatc  | ctgatttgtc | ctggctggaa  | gcacaagagg  | aggactcaga  | 8340 |
| tgtaggcttt | ccggtcagac  | cacaggtacc | tttgagacca  | atgacttata  | aggctgcttt  | 8400 |
| tgatctcagc | ttctttttta  | aagaaaagg  | gggactggat  | gggctaattt  | actccaagag  | 8460 |
| aagacaagac | atccttgatc  | tatgggtcta | taatacacaa  | ggattcttcc  | cagattggca  | 8520 |
| gaactacaca | ccagggccag  | ggactagact | cccactgacc  | tttgggtggg  | gcttcaaact  | 8580 |
| agtaccaatg | gaccagcag   | agatagagga | agccaataag  | ggagagaaca  | tcagtctatt  | 8640 |

```

acaccccatc tgccagcatg gaatggagga tgaagacaga gaagtgctgg tatggagatt 8700
taacagtagc ctagcacgga gacacctagc ccgagagctg catccggagt actacaaaga 8760
ctgctgacac agaagttgct gacaagggac tttccgcctg ggactttcca ggagaggcgc 8820
ggcctgggag gggctgggga gtggctaacc ctcagaagct gcatataagc agccgcttct 8880
cgctgtact gggctctctt tgttgacca gatttgagcc tgggagctct ctggttggca 8940
ggggaaccca ctgcttaagc ctcaataaag cttgccttga gtgcttc 8987

```

<210> 3

<211> 8953

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

```

<223> isolate="90CR056"; 137..1639:gene="gag" ;
      4388..4966:gene="vif"; 4906..5196:gene "vpr";
      5177..7782:gene="tat"; 5316..7972:gene="rev";
      5408..5650:gene="vpu"; 5577..8114:gene="env";
      8117..8737:gene="nef"

```

<400> 3

```

ttgatagtga aagtaaaacc agagaagatc tctcgacgca ggactcggct tgctgaagtg 60
cacacagcaa gaggcgagag cggcgactgg tgagtacgcc attttgtttt gactagcggga 120
ggctagaagg agagagatgg gtgcgagagc gtcagtatta agcggcggaa aattagatgc 180
ttggggagaaa attcggctaa ggccaggggg aaagaaaaaa tataggctaa aacatctagt 240
atggggcaagc agggagctgg aaagatttgc acttaacccc ggccttttag aaacaccaga 300
aggctgtcta cagataatag aacagataca gccagctatt aagacaggaa cagaagaact 360
taaatcatta tttaatctag tagcagtcct ctattgcgta catcgaaaaa tagatgtgaa 420
agacaccaag gaggcttttag ataagataga ggaaatacaa aacaaaagtc agcaaaaaac 480
acagcaagca gcagctgata aggaaaaaga caacaaggtc agtcaaaatt atcctatagt 540
acagaatgct caagggcaga tggtagacca ggccatatca ctaggacct taaatgcatg 600
ggtaaaagta gtagaagaaa aggcttttag ccagaagta ataccatgt tttcagcatt 660
atcagaagga gccacccac aagacttaaa tgctatgcta aatacagtgg ggggacatca 720
agcagccatg cagatgttaa aagatacaat caatgaggaa gctgcagaat gggacagggt 780
acatccagtg catgcagggc ctattccacc aggccaaatg agagaaccaa ggggaagcga 840
tatagcagga actactagta ccctgcagga acaaatagca tggatgacag gcaatccagc 900
tatcccagtg ggagacatct ataaaagatg gataatcctg ggattaaata agatagtaag 960
aatgtatagt cctgtcagca ttctggacat aaaacaaggg ccaaaagaac cctttagaga 1020
ctatgtagac aggtttttta aaactttaag agctgagcaa gccacacagg atgtgaagaa 1080
ttggatgaca gaaaccttgt tgggtccaaa tgcaaatcca gattgcaaga ctatattaag 1140
agcattagga caaggggctt caatagaaga aatgatgaca gcatgtcagg gagtgggagg 1200
acctagtcat aaagcaagag ttttggctga ggcaatgagc caagtaacaa atacaaatac 1260
agccataatg atgcagaaag gcaactttaa gggccaaaga aaatttgta aatgcttcaa 1320
ctgtggcaaa gagggacaca tagccagaaa ttgcagggcc ctaggaaaaa agggctgttg 1380
gaaatgtgga agagaaggac atcagatgaa agactgcaca gagagacagg ctaatttttt 1440
agggaattt tggccttcca gcaaaggagg gccaggaaat tttctccaga gcaggccaga 1500
accaacagcc ccaccagcag agagcttcgg gttcggagag gagatgaccc cctctccgaa 1560
gcaggagcag ctgaaggaca aggaacctcc cttagcttcc ctcagatcac tctttggcag 1620
cgaccccttg ttacagtaaa aatagagggg cagttaaggg aagctctatt agatacagga 1680

```



gcagatgata cagtattaga agagataaat ttgccgggaa aatggaaacc aaaaatgata 1740  
gggggaattg gaggttttat caaagtaaga cagtatgagc aagtagccat agaaatctgt 1800  
ggaaaaaagg ctataggtac agtattagta ggacctacac ctgtcaatat aattggaagg 1860  
aatatattga ctcaaattgg ttgcacctta aattttccaa ttagtcctat tgaaactgta 1920  
ccagtaaaat taaagccagg aatggatggc ccaaaggtta aacaatggcc attgacagaa 1980  
gaaaaaataa aagcattaac ggaaatttgt acagagatgg aaaaagaagg aaaaatctca 2040  
agaatagggc ctgagaatcc atacagcact ccaatatttg ccataaaaaa gaaggatagt 2100  
actaaatgga gaaaattagt ggatttcaga gaactcaata aaagaactca agacttctgt 2160  
gaagttcagt taggaatacc acaccagca gggttaaaaa agaaaaaatc agtatcagta 2220  
ctggatgtgg gggatgcata tttttcagtc ccttttagata aagaattcag aaagtatact 2280  
gcattcacca tacctagtat aaacaatgag acaccaggga ttagatatca gtataatgtg 2340  
cttcacaggg gatggaaagg atcaccagca atattccaga gtagcatgac aaaaatctta 2400  
gcgcctttta gagaacaaaa tcctgaaatg gttattttacc aatacatgga tgatttgtat 2460  
gtaggatctg acttagaaat agggcaacat agagcaaaaa tagaggagtt aagagctcat 2520  
ttgttgaaat ggggatttac cacaccagac aaaaaacatc agaaagaacc cccatttctt 2580  
tggatgggat atgaactcca tcctgacaaa tggacagtac agactgtaaa actgccagaa 2640  
aaagacagct ggactgtcaa tgatatacag aagttagtgg gaaaactaaa ttgggcaagt 2700  
cagatttatc caaatattaa agtaaagcaa ctatgtaaac tccttagggg ggccaaagca 2760  
ttaacagaca taataccact gacaaaagag gcagaattgg aattggcaga aaacaggagg 2820  
attctgagag aaccaatata tggagtatat tatgatccat caaaagactt aatagcagaa 2880  
atacggaagc aagggaagg ccaatggaca tatcaaattt atcaggagcc atttaaaaaat 2940  
ctgaagacag gaaaatatgc aaaaatgaga actgccaca ctaatgatat aaaacaatta 3000  
acagaagcag tgcaaaagat atctacagaa agcatagtaa tatggggaaa aattcctaaa 3060  
tttagactac ctatacaaaa agaaacatgg gagacctggt ggacagagta ttggcaagcc 3120  
acatggattc ctgaatggga gtttggttaac acccctcatc tagtaaaatt atggtatcag 3180  
ttagaaacag agcccatagc aggagcagaa acttactata tagatggggc agctaattagg 3240  
gaaactaaat taggaaaagc aggatatgtc actgatagag gaaagcaaaa agttgtctcc 3300  
ctaacggaaa caacaaatca gaagactgaa ttacaagcaa tttatctagc tttgcaagat 3360  
tcagggttag aagtgaacat agtgacagat tcacagtatg cactaggaat cattcaagca 3420  
caaccgata agagtgaatc agagttagtt aatcaaataa tagaggaatt aataaagaag 3480  
gaaaaggctc acctgtcatg ggtaccagca cacaaaggaa ttggaggaaa tgaacaagta 3540  
gataaattag ttagttctgg agtcagaaaa gtgctatttc tagatgggat agataaagct 3600  
caagaagaac atgaaaggta tcataacaat tggagagcag tggctagtga ttttaattcta 3660  
ccacctatag tagcaaaaga aatagtagct agctgtgata aatgtcagct aaaaggggaa 3720  
gccatgcatg gacaagtaga ctgtagccca ggaatatggc aattagattg cacacatttg 3780  
gaaggacaag ttattctggt agcagtcctat gtagccagtg gctatataga agcagaagtc 3840  
atcccagcag aaacaggaaa ggaaacagca tacttctgtg tgaaactagc aagcagatgg 3900  
ccagtaaaag taatacatat agacaatggc agcaatttca cgagtgtctg ggttaaggca 3960  
gcctgttggg gggcagatat ccaacaggaa tttgggattc cctacaatcc ccaaagtcag 4020  
ggagtagtag aatctatgaa taaagaatta aagaagatca tagggcaggt aagagaccaa 4080  
gcagaacacc ttaagacagc agtacaaatg gcagtattca ttcacaattt taaaagaaaa 4140  
ggggggattg gggggtacag tgcaggggaa agaataatag acataatagc aacagacata 4200  
caaactaaag aattacaaaa acaaatttca aacattcaaa aatttcgggt ttattacagg 4260  
gacagcagag acccaatttg gaaaggacca gcaaaactcc tctggaaagg tgaaggggca 4320  
gtagtaatac aagacaatag tgaaataaaa gtagtaccaa gaagagaggc aaaaatcatt 4380  
agggattatg gaaaacagat ggcagggtgat gattgtgtgg caagtagaca ggatgaggat 4440  
taacacatgg aaaagcttag taaagtacca tatgcatatt tcaaggaaag ctagaggatg 4500  
gttttataga catcattttg aaagcactca tccaaggata agttcagaag tacacatccc 4560

|             |             |            |             |             |             |      |
|-------------|-------------|------------|-------------|-------------|-------------|------|
| attaggagaa  | gctagggttag | tcataaccac | atactggggt  | ctgaatacag  | gagaaagaga  | 4620 |
| atggcattta  | ggccagggag  | tctccataga | atggagactg  | aaaaggtata  | gcacacaagt  | 4680 |
| agagcctggc  | ctggcagacc  | aactaattca | tatgcattat  | tttgattgtt  | tttcagaatc  | 4740 |
| tgccataaag  | aaagccatat  | taggacgtgt | agttagacct  | aggtgtaact  | atccagcagg  | 4800 |
| acataaacag  | gtaggaactc  | tacaatactt | ggcattaaca  | gcattagtgg  | caccaaaaaa  | 4860 |
| gataaagcca  | cctttgccta  | gtgttagaaa | gctagtagag  | gatagatgga  | acaagcccca  | 4920 |
| gaagaccagg  | ggccacagag  | ggagccacac | aatgaatgga  | cactagagct  | tttagaggag  | 4980 |
| attaagaatg  | aggtgttag   | gcatttttct | agagtatggc  | tccatcaatt  | aggacagcat  | 5040 |
| atctataaca  | cctatggaga  | tacttgggta | ggagtgtgaag | ctttaataag  | aacgctgcaa  | 5100 |
| caactactgt  | ttattcat    | cagaattggg | tgccaacata  | gcagaatagg  | aattactcga  | 5160 |
| cagagaagag  | taagaaatgg  | acccagtaga | tcctaaacta  | gagccctgga  | accatccagg  | 5220 |
| aagttagcct  | caaactgctt  | gtaacaattg | ttattgtaaa  | aagtgtctgt  | atcattgcca  | 5280 |
| aatgtgcttt  | ttaaagaaag  | gcttaggaat | ttcctatggc  | aggaagaagc  | ggagccagcg  | 5340 |
| acacagaact  | cctgcaagtt  | tgcaagatca | tcaaaattct  | atatcaaagc  | agtaagtatt  | 5400 |
| atcataaatg  | tatatattag  | gattaggaat | aggagcgcta  | gtagtaacat  | ttatcatagc  | 5460 |
| cgtaattgtg  | tggaccatag  | tatatataga | atataaaaaa  | ttggtaaggc  | aaaagaaaaa  | 5520 |
| agacaggcta  | attgaaagaa  | taggagaaag | agcagaagac  | agtggcaacg  | agagtgtagg  | 5580 |
| agacacagag  | gaattatcca  | agcttatgga | gatggggcac  | cttaatcttg  | ggtatgttgc  | 5640 |
| tgatctgtag  | tgctgcacaa  | aacttgtggg | ttacagtata  | ttatggggta  | cctgtgtgga  | 5700 |
| aagaggcaaa  | aaccactcta  | ttctgtgcat | cagatgctaa  | ggcatatgag  | acagaaaagc  | 5760 |
| ataatgtctg  | ggctacacat  | gcatgtgtac | ccacagaccc  | caaccacaa   | gagatgggtca | 5820 |
| tggagaatgt  | aacagagagc  | tttaatatgt | gggaaaataa  | catggtggag  | cagatgcata  | 5880 |
| cagacataat  | cagtttatgg  | gatcaaagct | tgaaccatg   | tgtaaaatta  | acccactct   | 5940 |
| gtgttactct  | aaactgtact  | aatgtcagaa | acaatacctc  | taacagcact  | agcagtatgg  | 6000 |
| aggcaggagg  | ggaactaaca  | aattgtctct | tcaatgtaac  | tacagtacta  | agagataagc  | 6060 |
| agcagaaagt  | acatgcactc  | ttttatagac | ttgatgtagt  | accaattgat  | aacaatagta  | 6120 |
| ctcagtatag  | gctaataaat  | tgtaatacct | cagtcattac  | acaggcttgc  | ccaaaggtgt  | 6180 |
| cctttgaacc  | tattcccata  | cattattgtg | ctccagctgg  | ctttgctgatt | ctaaagtgtg  | 6240 |
| acaataaaaac | attcaatgga  | acaggattat | gtacaaatgt  | cagtacagta  | caatgtacac  | 6300 |
| atggaattag  | accagtggta  | tcaactcaac | tgctattaaa  | tggaagccta  | gcagaagaac  | 6360 |
| agatcataat  | tagaactaaa  | aatatctcag | acaataccaa  | aaacataata  | gtacagctta  | 6420 |
| agacaccagt  | aaacattaca  | tgtaccaggc | ctaacaataa  | tacgagaaca  | agtatacatt  | 6480 |
| tagggccagg  | acgagcattc  | tatgcaacag | gtgacatcat  | aggagatata  | agacaagcac  | 6540 |
| attgtaatat  | tagtagaaca  | gactggaata | agactttaca  | ccaggtagtt  | acacaattag  | 6600 |
| gaatacactt  | gaacaataga  | acaataagct | ttaagccaaa  | ctcaggaggg  | gacatggaag  | 6660 |
| ttagaacaca  | tagttttaat  | tgtagaggag | aatttttcta  | ttgcaataca  | tcagggtgt   | 6720 |
| ttaatagtag  | ttgggaaatg  | catactaatt | acacatcaaa  | tgacacaaag  | ggaaacgaaa  | 6780 |
| acattacact  | gccatgcaga  | ataaaacaaa | ttgtaaacat  | gtggcagaga  | gtaggacgag  | 6840 |
| caatgtatgc  | ccctcccatc  | caaggaaaca | ttatgtgtgt  | atcaaataat  | acaggactaa  | 6900 |
| tattgacaat  | tgacgagggt  | aacgcgtctg | cagaaaatta  | taccttcaga  | cctggaggag  | 6960 |
| gagatatgag  | ggacaattgg  | agaagtgaat | tgtataaata  | taaagtagta  | aaaattgaac  | 7020 |
| cactgggaat  | agcaccacc   | aagacaagga | gaagagtgg   | ggagagagaa  | aaaagagcag  | 7080 |
| tgggaatggg  | agcttctttc  | cttgggttct | tgggagcagc  | aggaagcact  | atgggcgcgg  | 7140 |
| cgtcaataac  | gctgacggtg  | caggccaggc | aattattgtc  | tggtatagt   | cagcagcaaa  | 7200 |
| gcaatttgct  | gagagctata  | caggcgcgac | agcatatgtt  | gcagctcacg  | gtctggggca  | 7260 |
| ttaaacagct  | ccaggcaaga  | gtcctcgctg | tggaaagata  | cctaagggat  | caacagctcc  | 7320 |
| tggggatttg  | gggctgctct  | ggaaaactca | tctgcaccac  | taatgtgcct  | tggaactcta  | 7380 |
| gttgagtaa   | taaatacacag | agtgaatct  | gggacaacat  | gacttggatg  | gaatgggata  | 7440 |

```

aacaaattag caattacaca gaggaatat acaggttgcg tgaagtctcg caaaccagc 7500
aggaaaagaa tgaacaggac ttattagcat tggacaaatg ggcaagtctg tggacttggc 7560
ttgacatatac acattggcgtg tggatatataa aaatattcat aatgatagta ggaggtttaa 7620
taggttttaag aataatTTTT gctgtgcttt ctatagtaaa tagagttagg cagggatact 7680
cacctttgtc ttttcagacc cttgtcccga acccacgggg acccgacagg cccgaaggaa 7740
cagaagaagg aggtggcgag caagacagag acagatccgt gagattagt aacggattct 7800
taccagttgt ctgggacgac ctccggagcc tgtcactctt cagctaccgc ctcttgagag 7860
acttactctt aattgtagtg aggactgtgg aacttctggg gagaaggggg agggaagccc 7920
tcaaatatct ctggaatctt ctacaatact ggggacagga actaaagaat agtgctattg 7980
atttgcttaa caccacagca atagcagtag ctgagggaa acatgggatt atagtaatag 8040
tgcaaagagc ttggagagct attctccaca tacctagaag aataagacag ggctttgaaa 8100
gaagcttgct ataataatgg gagggcaaat gtcaaaaagt aggatgggtg ggtggtctac 8160
tataaggga agaagtaggc gagctgaacc agtagcagaa ggggtaggag cagtgtctcg 8220
agatttgat agacgcgggg cagtcacaat taataataca gcatctacta atcgtgatgc 8280
cgcttgctg gaagcacaag aggacgggga ggaagtaggc tttccagtca ggctcaggt 8340
acctttaaga ccaatgacct ataaggagc ttttgatctc agccattttt taaaagaaaa 8400
ggggggactg gatgggttaa tttactcaa gcaaagacag gacatccttg atttatgggt 8460
ctataacaca caaggctact tcctgactg gcagaactac acaccagggc caggggagag 8520
atttccctg acctttgggt ggtgcttcaa gctagtacca gtaaatccac aggaggtaga 8580
acaggccaat gaaggagaga acaacagctt gctacacccc atgagcctgc atggaatgga 8640
ggatgacggg agagaagtgc tgatgtggaa atttgacagt cgactagcat tgacacactt 8700
ggcccgagta aagcatccg agtacaaga ctgctgacac agaagatctg aaagggactt 8760
tccgctggga ctttccgggg aggcgtgatc tgggcgggga tggggagtgg ccaaccctca 8820
gatgctgcat ataagcagct gcttttcgct tgtactgggt ctctttgggt agaccagatc 8880
tgagcctggg agctctctgg ctagctaagg aaccactgc ttaagcctca ataaagcttg 8940
ccttgagtgc ttt
8953

```

<210> 4

<211> 8992

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

```

<223> isolate=92RW009; 139.1624:gag;
      <1690.4428:pol(N-terminus uncertain);
      4373.4951:vif; 4891.5181:vpr; 5162.7801:tat;
      5301.7958:rev; 5403.5648:vpu; 5566.8148:env;
      8150.8773:nef

```

<400> 4

```

atgaaagcga aagtaagacc agaggagatc tctcgacgcg ggactcggct tgctgaaagt 60
gcactcggca agaggcgaga gcggcggtcg gtgagtacgc caaattttat ttgactagcg 120
gaggctagaa ggagagagat ggggtgcgaga gcgtcaatat taagaggcgg aaaattagat 180
gcctgggaaa aaattaagtt aaagccaggg gggaaagaaa acatatatga tgaaacacct 240
agtatgggca agcaggggagc tggaaagatt tgcacttaac cctgaccttt tagagacacc 300
agaaggctgt aaacaaataa tgagacagct gcaaccagct cttcagacag gaacagatga 360
acttaggtca ttatataata cagtagcaac cctctattgt gtacatcaaa agatagatgt 420
aaaagacacc aaggaggcct tagacaagat agaggaagaa caaaacaaaa gtcagcaaaa 480

```

|            |             |             |            |            |             |      |
|------------|-------------|-------------|------------|------------|-------------|------|
| aacacagcag | gcagaagcag  | ctgacaaaagg | aaaagtcagt | caaaattacc | ctatagtgca  | 540  |
| aaatgcacaa | gggcaaattg  | tacaccaggc  | catatcacct | agaactttga | atgcgtgggt  | 600  |
| aaaagtaata | gaggagaagg  | cttttagcca  | agaggtaata | cccatgttta | cagcattatc  | 660  |
| agaaggagcc | accccacaag  | atttaaacac  | catgctaaat | acagtggggg | gacatcaagc  | 720  |
| agccatgcaa | atgctaaaag  | atacaatcaa  | tgaggaggct | gcagagtggg | ataggggtaca | 780  |
| tccagtgcag | gcagggcctg  | ttgcgccagg  | ccagataaga | gaaccaaggg | gaagtgcacat | 840  |
| agcaggaact | actagtaccc  | ttcaggaaca  | aatagcatgg | atgacaaata | accacacctat | 900  |
| tccagtggga | gaaattttata | aaagatggat  | aattctgggg | ttaaataaaa | tagtaagaat  | 960  |
| gtatagccct | gtcagcatat  | tggacataaa  | acaagggcca | aaggaacctt | ttagagacta  | 1020 |
| tgtagaccgg | ttcttttaaaa | ccttaagagc  | cgaacaagct | tcacaagatg | taaaaaattg  | 1080 |
| gatgacagat | accttggttag | tccaaaatgc  | gaaccagat  | tgtaagacca | ttttaagagc  | 1140 |
| attagggcca | ggggcttcat  | tagaagaaat  | gatgacagca | tgccagggag | tgggaggacc  | 1200 |
| cggccataaa | gcaaggggtt  | tggctgaagc  | aatgagccaa | gtacaacaac | caaacataat  | 1260 |
| gatgcagaga | ggcaattttta | agggccagag  | aagaattatt | aagtgtttca | actgtggcaa  | 1320 |
| agaaggacac | ctagccagaa  | attgcagggc  | ccctagaaaa | aagggctgtt | ggaaatgtgg  | 1380 |
| aaaggaggga | caccaaata   | aagactgcac  | tgagagacag | gctaattttt | tagggaaaat  | 1440 |
| ttggccttcc | aacaagggga  | ggccaggaaa  | ttttccccag | agcagactgg | agccaacagc  | 1500 |
| cccaccagca | gagaactttg  | gaatggggga  | agagatagcc | tctcctctga | aacaggagca  | 1560 |
| gaaagacagg | gaacctttta  | tttcctcaa   | atcactcttt | ggcaacgacc | ccttgtcaca  | 1620 |
| gtaaaaatag | gaggtcagct  | aagagaagct  | ctattagata | caggagcaga | tgatacagta  | 1680 |
| ttagaagaaa | taaatttgcc  | aggaaaatgg  | aaacaaaaa  | tgataggggg | aattggaggt  | 1740 |
| tttatcaagg | taaaacagta  | tgatcaaata  | cttatagaaa | tttgtggaaa | aaaggctata  | 1800 |
| ggtacagtat | tagtaggacc  | tacatctgtc  | aacataattg | gaagaaatat | gttgaccag   | 1860 |
| attggttgta | ctttaaactt  | tccaattagt  | cctattgaga | ctgtaccagt | agcattaaag  | 1920 |
| ccaggaatgg | atggcccaaa  | ggttaaacia  | tggccattga | cagaagaaaa | aataaaagca  | 1980 |
| ttaagagaaa | tttgtacaga  | aatggaaaaa  | gagggaaaaa | tttcaaaaat | cgggcctgaa  | 2040 |
| aatccatata | acactccagt  | atttgccata  | aaaaagaagg | acagtactaa | gtggagaaaa  | 2100 |
| ttagtagatt | tcagggaact  | caacaaaaga  | actcaagact | tttggaagt  | ccaattagg   | 2160 |
| ataccacacc | cagcagggtt  | aaagaagaaa  | aatcagtga  | cagtactgga | tgtgggggat  | 2220 |
| gcatacttct | cagttccttt  | agatgagagc  | ttcaggaaat | atactgcatt | caccatacct  | 2280 |
| agtataaaca | atgaaacacc  | aggaattagg  | tatcaatata | atgtgcttcc | acagggatgg  | 2340 |
| aaaggatcac | cagcaatatt  | ccaaaatagt  | atgacaaaaa | tcttagagcc | ctttagggca  | 2400 |
| caaaaccaag | aaatagtgtat | ctatcaatat  | atggatgact | tgtacgtagg | atctgactta  | 2460 |
| gaaatagggc | aacatagagc  | aaaaatagag  | gagttaaag  | aacatctatt | aaagtgggga  | 2520 |
| tttaccacac | cagacaagaa  | acatcagaaa  | gaacctccat | ttctttggat | ggggtatgaa  | 2580 |
| cttcacctg  | acaaatggac  | agtacaacct  | atacagctgc | cagaaaagga | tagctggact  | 2640 |
| gtcaatgata | tacagaagtt  | agtgggaaaa  | ttaaactggg | caagtcagat | ttaccagggg  | 2700 |
| gttaaagtaa | ggcaattgtg  | taaactcctt  | aggggaacca | aagcattaac | agacatagta  | 2760 |
| ccactaactg | aagaagcaga  | attagaattg  | gcagaaaaca | gggaaatttt | aaaagaacca  | 2820 |
| gtacatggag | tatattatga  | cccatcaaaa  | gacttaatat | ctgaaataca | gaaacagggg  | 2880 |
| catgaccaat | ggacatatca  | aattttacca  | gaaccattca | aaaatctgaa | aacagggaaag | 2940 |
| tatgcaaaaa | ggaggactgc  | ccacactaat  | gacgtaaaaa | agttaacaga | ggcagtgcaa  | 3000 |
| aagatagcca | tggaaagcat  | agtaatatgg  | ggaaagactc | ctaaatttag | attacccatc  | 3060 |
| cagaaagaaa | catgggaaac  | atggtggaca  | gactattggc | aagccacctg | gattcctgag  | 3120 |
| tgggagtttg | ttaatacccc  | tcccctagta  | aaattatggg | accagctaga | gaaagaaccc  | 3180 |
| atattaggag | cagagacttt  | ctatgtagat  | ggagcagcta | atcgggaaac | taaaatagga  | 3240 |
| aaagcagggt | atgttactga  | cagaggaagg  | cagaaaattg | tttctctaac | tgaaacaaca  | 3300 |
| aatcagaaga | ctgaattaca  | agcaattcag  | ctagctttac | aggattcagg | atcagaagta  | 3360 |

|             |             |             |             |             |             |      |
|-------------|-------------|-------------|-------------|-------------|-------------|------|
| aacatagtaa  | cagactcaca  | gtatgcatta  | ggaatcattc  | aagcacaacc  | agatagcagc  | 3420 |
| gaatcggagg  | cagtcaatca  | aataatagaa  | cagttaataa  | aaaaggaaaag | agtctacctg  | 3480 |
| tcatgggtac  | cagcacataa  | aggaattgga  | ggaaatgaac  | aagtagataa  | attagtaagt  | 3540 |
| agtggaatca  | ggagagtgt   | gtttctagat  | ggaatagata  | aggctcaaga  | agaacatgaa  | 3600 |
| agatatcaca  | gcaattggag  | agcaatggct  | agtgatttta  | atctgccacc  | tatagtagca  | 3660 |
| aaggaaatag  | tagccagctg  | tgataagtgt  | cagctaaaag  | gggaagccat  | gcatgggcaa  | 3720 |
| gtagactgta  | gtccagggat  | atggcaatta  | gactgtacac  | atctggaagg  | aaaaataatc  | 3780 |
| ctggtagcag  | tccatgcagc  | cagtgggttat | atagaagcag  | aggttattcc  | agcagaaaca  | 3840 |
| ggacaagaaa  | cagcatactt  | tatactaaaa  | ttagcaggaa  | gatggccagt  | caaagtaata  | 3900 |
| catacagaca  | atggcagtaa  | tttcaccagt  | aatacagtta  | aagcagcctg  | ttggtgggca  | 3960 |
| ggtatccaac  | aggaattttg  | aattccctac  | aatcccaaaa  | gtcagggagt  | aatagaatcc  | 4020 |
| atgaataaag  | aattaaagaa  | aatcataggg  | caggtaagag  | atcaagctga  | gcaccttagg  | 4080 |
| acagcagtac  | aaatggcagt  | attcattcac  | aattttaaaa  | gaaaaggggg  | gattgggggg  | 4140 |
| tacagtgcag  | gggaaagaat  | aatagacata  | atagcaacag  | acatacaaac  | taagggaatta | 4200 |
| caaaaacaaa  | ttacaaaaat  | tcaaaatttt  | cgggtttatt  | acagggacag  | cagagatcca  | 4260 |
| atttggaag   | gaccagccaa  | actactctgg  | aaaggtgaag  | gggcagtagt  | aatacaggac  | 4320 |
| aatagtgata  | taaaagtagt  | accaagaaga  | aaagcaaga   | tcattaggga  | ttatggaaaa  | 4380 |
| cagatggcag  | gtgatgattg  | tgtggcaggt  | agacaggatg  | aagattagaa  | catggaatag  | 4440 |
| tctagtaaag  | caccatatgt  | atgcttcaag  | gagagctaag  | ggatggtttt  | atagacatca  | 4500 |
| ttatgaaagc  | agacatccaa  | aaataagttc  | agaagtacac  | atcccattag  | gggaagctag  | 4560 |
| attagtaata  | aaaacatatt  | ggggtttgca  | aacaggggaa  | agagattggc  | atttggtgca  | 4620 |
| tggagtctcc  | atagaatgga  | gattgagaag  | atataagaca  | caagtagacc  | ctggcctggc  | 4680 |
| aggccaacta  | atccatatgc  | attattttga  | ttgttttgca  | gactctgcca  | taaggaaaagc | 4740 |
| catattagga  | catatagtta  | gccctagggtg | tgactatcaa  | gcaggacata  | ataaggtagg  | 4800 |
| atctctacaa  | tacttggcac  | tgacagcatt  | gataaaaacca | aaaaagataa  | agccacctct  | 4860 |
| gcctagtgtt  | agtaaattag  | tagaggataa  | atggaacaag  | ccccagaaga  | ccaggggccg  | 4920 |
| cagaggggaa  | catacaatga  | atggacacta  | gagcttttag  | aggcactcaa  | gcaggaagct  | 4980 |
| gtcagacact  | ttcctagacc  | atggctccat  | gacttaggac  | aatatatcta  | tgaaacctat  | 5040 |
| ggggatactt  | ggaggggagt  | agaagctata  | ataagaattc  | tgcaacaact  | actgtttatc  | 5100 |
| catttcagaa  | ttgggtgccg  | gcatagcaga  | ataggcattt  | tgcaacagag  | aagagcaaga  | 5160 |
| aatggagcca  | gtagatccta  | aactagagcc  | ctggaaccat  | ccaggaagtc  | agcctaaaac  | 5220 |
| tgctgtaat   | aactgttatt  | gtaaacactg  | tagctatcat  | tgtctagttt  | gcttcagggc  | 5280 |
| aaaaggctta  | ggcatttcct  | atggcaggaa  | gaagcggaga  | cagcgacgaa  | acgctcctcc  | 5340 |
| aagcagtga   | gatcatcaaa  | atcctatatc  | aaagcagtaa  | gtagtaataa  | acagtatatg  | 5400 |
| taatgacttc  | tttagaaatc  | tatgcaatag  | tagcactgat  | agtggcgcta  | atcatagtga  | 5460 |
| tagttgtgtg  | gacttttagca | ggtatagaat  | ataagaaatt  | gctaaagcaa  | agggaaatag  | 5520 |
| ataggttaat  | taagaaaata  | agagaaagag  | cagaagatag  | tggcaatgag  | agtgatgggg  | 5580 |
| acattgatga  | attatcaaaa  | cttgtggggg  | tggggaaacta | tgatcttggg  | gatgttaaca  | 5640 |
| atttgtagtg  | ctgcaaacaa  | cttgtggggt  | actgtctact  | atgggggtacc | tgtgtggaaa  | 5700 |
| gacgcagaga  | ccaccttatt  | ttgtgcatca  | gatgctaaag  | catatgatcc  | agaaaagcat  | 5760 |
| aatgtctggg  | ctacacatgc  | ctgtgtaccc  | atagaccccg  | accacaaga   | aatacatttg  | 5820 |
| gaaaatgtga  | cagaagagtt  | taacatgtgg  | aaaaataaca  | tggtagagca  | gatgcataca  | 5880 |
| gatataatca  | gtctatggga  | ccaaagccta  | aagccatgtg  | taaagttaac  | ccctctctgc  | 5940 |
| gttacttttag | agtgtaaaca  | catcaccaat  | gtcaacaaca  | ctgtcaacat  | tacggatgac  | 6000 |
| atgaaaggag  | aaataaaaaa  | ctgctctttc  | aatatgacca  | cagaattaag  | ggataagaaa  | 6060 |
| cagagagtgt  | attcactttt  | ttataggctt  | gatatagtac  | aaattaatag  | caatagtaat  | 6120 |
| aacagtagtc  | ataatcagta  | taggttaata  | aattgtaata  | cctcagccat  | tacacaggct  | 6180 |
| tgtccaaagg  | tatcctttga  | gccaatcccc  | ataaattatt  | gtgccccagc  | tggtttcgcg  | 6240 |

|             |            |             |            |             |             |      |
|-------------|------------|-------------|------------|-------------|-------------|------|
| attctaaagt  | gtaaagataa | aaagttcaat  | ggaacagggc | catgcaagaa  | tgtcagcaca  | 6300 |
| gtacaatgca  | cacatggaat | caagccagta  | gtatcaactc | agctgctgtt  | aatggcagt   | 6360 |
| ctagcagaag  | aagagataat | aattagatct  | gaaaatatta | caaacaatgc  | caaaaccata  | 6420 |
| atagtacaac  | ttaacgagac | tgtacaaatt  | aattgttcca | gacctaacaa  | caatacaaga  | 6480 |
| aaaagtgtac  | atataggacc | aggacaagca  | ttttatgcaa | caggtgacgt  | aataggggat  | 6540 |
| ataagacaag  | catattgtac | tgtcaatgga  | acaaaatgga | atagaacttt  | acaaaaggta  | 6600 |
| gcagaaaaat  | taagtcacta | ctttgagaac  | attacaacaa | taatttttaa  | gaactcctca  | 6660 |
| gggggggatt  | tagaaattac | aacacatagt  | tttaattgtg | gaggagaatt  | tttctattgt  | 6720 |
| aatacatcag  | gcttgtttta | tagcacctgg  | agtaaaagaa | atggcacctg  | gcagtcaa    | 6780 |
| ggcacagaat  | taaatataac | actcccatgc  | agaataaagc | aaattataaa  | tatgtggcag  | 6840 |
| aggacaggac  | aagcaatgta | tgccccctcc  | atccaaggag | taataagctg  | tgtatcaa    | 6900 |
| attacaggac  | tactattaac | aagagatggg  | ggaaataata | atactacaac  | tgaaaccttc  | 6960 |
| agacctggag  | gaggagatat | gagggataat  | tggagaagtg | aactatataa  | atataaagta  | 7020 |
| gtaaaaattg  | aaccactagg | agtagcacc   | accagggcaa | agaggagagt  | ggtggagaga  | 7080 |
| gaaaaaagag  | cagttggact | gggagctgtc  | ttcattgggt | tcttaggagc  | agcaggaagc  | 7140 |
| actatgggcg  | cggcgtcaat | aacgctgacg  | gtacaggcca | gacaattatt  | gtctggcata  | 7200 |
| gtgcaacagc  | aaagcaattt | gctgagggct  | atagaggctc | aacagcatct  | attaaaactc  | 7260 |
| acagtctggg  | gcattaaaca | gctccaggca  | agagtcctgg | ctctggaaag  | atacctaagg  | 7320 |
| gatcaacagc  | tcttaggaat | ttggggctgc  | tctggaaaac | tcatctgcac  | cactaatgtg  | 7380 |
| ccctggaact  | ctagttggag | taataagact  | cagcaggaaa | tatgggataa  | catgacctgg  | 7440 |
| cagcaatggg  | ataaagaaat | tggcaattac  | acacaaataa | tatatagtct  | aattgaagaa  | 7500 |
| tcgcagaacc  | agcaggaaaa | gaatgaacaa  | gacttattgg | cattggacaa  | gtgggcaa    | 7560 |
| ctgtggaatt  | ggtttgacat | atcaaattgg  | ctgtggtata | taaaaatatt  | cataatgata  | 7620 |
| gtaggaggct  | taatagggtt | aagaataatt  | tttgcgtg   | tctctatagt  | gaacagagtt  | 7680 |
| aggcagggat  | actcaccatt | atcgtttcag  | acccttatcc | caaacccgag  | gggacccgac  | 7740 |
| aggctcggag  | gaatcgaaga | agaagggtgga | gagcaagaca | gaggcagatc  | cattcgatta  | 7800 |
| gtgagcggat  | tcttagcact | tgccctgggac | gacctacgga | gcctgtgcct  | tttcagctac  | 7860 |
| caccgattga  | gagacttact | attgattgca  | gcgaggacgg | tggaaacttct | gggacgcagc  | 7920 |
| agtctcaggg  | gactacagag | ggggtgggaa  | acccttaagt | atctaggaaa  | tcttgtgcag  | 7980 |
| tattggggct  | tggaaactaa | aaggagtgtc  | attaatctgc | ttgataccac  | agcaatagta  | 8040 |
| gtagctgaag  | gaacagatag | gattatagaa  | ttaatacaaa | gaattagcag  | agctatctat  | 8100 |
| aacataccta  | gcagaataag | acagggtctt  | gaagcagctt | tgcaataaaa  | tgggaagcaa  | 8160 |
| gtggtcaaaa  | tgtagtccag | taggatggcc  | tgctgtaaga | gaaagactaa  | ggcaaactga  | 8220 |
| gccagcagca  | gagggagtag | gagcagcgtc  | tcaagaccta | gacaaatatg  | gggcacttac  | 8280 |
| aagtagcaac  | acaccagca  | acaatgctga  | ttgtgcctgg | ctggcagcac  | aagaggagga  | 8340 |
| aaacgaagta  | ggctttccag | tcagacctca  | ggtgccttta | agaccaatga  | cttataaagc  | 8400 |
| agcagttgat  | ctcagcttct | ttttaaaaga  | aaagggggga | ctggaagggt  | taatttactc  | 8460 |
| taagaaaagg  | caagacatcc | tggatttgtg  | ggtctataac | acacaaggct  | acttccctga  | 8520 |
| ttggcaaaac  | tacacaccag | gaccaggggt  | cagatatcca | ctgacttttg  | gatggtgtta  | 8580 |
| caagctagtg  | ccagttgacc | caagggaagt  | ggaagaagcc | aatgaaggag  | aggacaactg  | 8640 |
| cttactacac  | cctctgagcc | agcatggaat  | ggaggatgag | gacagagaag  | tcttaaagtg  | 8700 |
| gaagtttgac  | agtcacctag | cacacagaca  | catggcccgc | gagctacatc  | cggagtatta  | 8760 |
| taaagactgc  | tgacacagaa | gggactttcc  | gctgggactt | tccactgggg  | cgggtccagga | 8820 |
| ggtgtggtct  | gggcgggacg | gaggagtggc  | caaccctcag | atgctgcata  | taagcagctg  | 8880 |
| ctttttgcct  | gtactgggtc | tctctgggta  | gaccagatct | gagcctggga  | gctctctggc  | 8940 |
| tatctagggga | accactgtct | taagcctcaa  | taaagcttgc | cttgagtgtct | ct          | 8992 |

<210> 5

<211> 8966  
<212> DNA  
<213> Human immunodeficiency virus type 1

<220>

<223> isolate="92NG003"; 157..1650:gene:"gag";  
4408..4986:gene:"vif"; 4926..5039:gene:"vpr";  
5184..7762:tat; 5323..7967:gene:"rev";  
5425..5654:gene:"vpu"; 5572..8109:gene:"env";  
8111..8731:gene:"nef"

<400> 5

```
ttgaaagcga aagttaacag ggactcgaaa gcgaaagtgc cagagaagtt ctctcgacgc 60
aggactcggc ttgctgaggt gcacacagca agaggcgaga gcggcgactg gtgagtacgc 120
caattttttt gactagcgga ggctagaagg agagagatgg gtgcgagagc gtcagtatta 180
agcgggggaa aattagatgc atgggaaaaa attcggttga ggccaggggg aaagaaaaaa 240
tatagaatga aacatttagt atgggcaagc aggggaactgg agagatttgc acttaaccct 300
gacctcttag aaacaacaga aggttgtcag caaataatga gacagctgca accatctctc 360
cagacaggaa cagaggagat taaatcatta tttaatacag tagcaaccct ctattgtgta 420
catcaaagga tagaggtaaa agacacccaa gaagctctag aggaagtggg aaaaatacaa 480
aagaacagtc agcaagaaac acagaaggca gcaatgggta aaggaaacag cagccaagtt 540
agccaaaatt atcctatagt gcagaatgca caagggcaag tggtagacca gcccatatca 600
cctaggactt taaatgcatg ggtaaaagta atagaagaaa agaacttcag tccagaagta 660
atacccatgt ttacagcatt atcagaagga gccacccccc aagatttgaa taccatgcta 720
aacaccgtgg gggggcatca agcagctatg caaatgctaa aagattctat taatgaagaa 780
gctgcagagt gggataggct acatccacaa caggcaggac ctattccacc aggccagata 840
agagaacca ggggaagtga tatagcagga actactagta ccctgcagga acaataaca 900
tggatgacca gcaaccacc tatcccagtg ggagaaattt ataaaagatg gataattctg 960
gggttaaata aaatagttag aatgtatagc cctgtcagta ttttagacat aaaacaagg 1020
ccaaaagaac ctttcagaga ttatgtggat aggttcttta aaactttgag agctgagcaa 1080
gccacacagg aggtaaaaaa ctggatgaca gacacctgtg tgggtccaaa tgcgaaccca 1140
gattgtaaga ccataccta agcattagga gcaggagcta cactagaaga aatgttgaca 1200
gcatgtcaag gagtgggagg acccagccac aaagcaagag ttttagctga ggcaatgagc 1260
cgggcaacag gtacatcagc agccataatg atgcagaaaa acaattttta gggcccgaga 1320
agaggtatta agtgtttcaa ctgtggcaag gaaggacatc tagccagaaa ttgcagggcc 1380
cctaggaaaa aaggctgttg gaaatgtgga aaggaggagc atcaaataga agactgcaca 1440
gagagacagg ctaatttttt agggaaaatt tggccttcca acaaggggag gccagggaat 1500
tttcttcaga acaggccaga gccaacagcc ccacccgcag agagcttcgg gttcggagag 1560
gagatagccc cttccctgaa gcaggagccg agggaaaagg aatcacctcc attaacctcc 1620
ctcaaatac tctttggcaa cgacccttag tcacagtaag aataggggga cagctaatag 1680
aagctctatt agacacagga gcagatgata cagtattaga acaataaat ttaccaggaa 1740
aatggaaacc aaaaatgata gggggaattg gaggatttat caaagtaaaa cagtatgatc 1800
aaatacttat agaaattgaa gggaaaaagg ctatagggag agtactagta ggacctacac 1860
ctatcaacat aattgggaga aatatgttga ctcaaattgg ttgtacttta aattttccaa 1920
ttagtcttat tgagactgta ccagtaaaat taaaaccagg aatagatggc ccaaagggtta 1980
aacaatggcc attgacagaa gagaaaataa aagcattaac agaaatttgt acagatatgg 2040
aaaaggaagg aaaaatttca aaaattgggc cagaaaatcc atacaacact ccaatatttg 2100
ccataagaa aaaagacagt actaaatgga gaaagttggt agatttcaga gagctcaata 2160
```

|             |             |             |             |            |            |      |
|-------------|-------------|-------------|-------------|------------|------------|------|
| aaagaactca  | agacttctgg  | gaggtccaat  | taggcatacc  | tcatcccgcg | gggttaaaaa | 2220 |
| agaaaagatc  | agtaacagta  | ctagatgtgg  | gggatgcata  | tttttcaatt | cccctagatg | 2280 |
| aaaacttttag | aaagtataca  | gcattcacta  | tacctagtat  | aaataatgag | acaccagggg | 2340 |
| ttagatatca  | gtacaatgtg  | cttccgcaag  | gatggaaagg  | atcaccagca | atatttcaga | 2400 |
| gtagcatgac  | aaaaatctta  | gaacccttta  | gaacagaaaa  | tccagaaata | gtgatctatc | 2460 |
| agtacatgga  | tgatttatat  | gtaggatctg  | acttagaaac  | agggcagcat | agagcaaaaa | 2520 |
| tagaggaatt  | aagaaatcat  | ctactgagat  | ggggattttac | cacaccagat | aaaaaacatc | 2580 |
| agaaagaacc  | tccatttctc  | tggatgggat  | atgagctcca  | tcctgacaaa | tggacggtac | 2640 |
| aacctataca  | gctgccaaac  | aaagaaagct  | ggactgtcaa  | tgatatacaa | aaattagtgg | 2700 |
| gaaaactaaa  | ttgggcaagt  | cagattttatc | cagggattaa  | agtaaagcaa | ctatgtaaac | 2760 |
| tccttagggg  | ggccaaagca  | ctaacagaca  | tagtaccact  | gactgaagaa | gcagaattag | 2820 |
| aattggcaga  | gaacagggaa  | attctaaaag  | aacctgtaca  | tggagtctac | tatgacccat | 2880 |
| caaaagaatt  | aatagcagaa  | ttacagaaac  | aaggggtgcga | ccaatggaca | tatcaaattt | 2940 |
| atcaagagcc  | atacaaaaat  | ctgaaaacag  | gaaagtatgc  | aaaaaggggg | tctgcccaca | 3000 |
| ctaagtatgt  | aaaacagtta  | acagaagcag  | tgcaaaaaat  | agccacagag | agcatagtaa | 3060 |
| tatggggaaa  | agttcctaaa  | tttaactac   | ctataaggaa  | agaaacatgg | gaagtatggg | 3120 |
| ggacagaata  | ttggcaggcc  | acctggattc  | ctgattggga  | gtttgtcaat | acctctctc  | 3180 |
| tagtaaagtt  | atgggtatcga | ttagaaacag  | aaccatacc   | aggagcagaa | acttactatg | 3240 |
| tagatggggc  | agctaataaa  | gaaacaaaat  | taggaaaggc  | aggatatgtt | actgacagag | 3300 |
| gaaaacaaaa  | aattatcacc  | atacaggaaa  | caacaaatca  | aaaaactgaa | ttacacgcaa | 3360 |
| ttcagctagc  | tttgccaggt  | tcaggatcag  | aagtaaacat  | agtaacagac | tcacagtatg | 3420 |
| cattaggaat  | cattcaagca  | caaccagata  | ggagtgaatc  | agaattagtc | aatcaaataa | 3480 |
| tagaacagct  | aataaaaaag  | gaaaaggctc  | acttaacatg  | ggtaccagca | cacaaaggaa | 3540 |
| ttgggggaaa  | tgaacaagta  | gataaattag  | tcagtagtgg  | aatcagaaaa | gtactgtttt | 3600 |
| tagatggcat  | agacaaagct  | caagaggacc  | atgaaagata  | tcacagcaat | tggagagcaa | 3660 |
| tggctagtga  | ttttaatctg  | ccacctatag  | tagcaaaaaga | aatagtggcc | agctgtgata | 3720 |
| aatgtcagct  | aaaaggggaa  | gccatgcatg  | gacaagtaga  | ctgtagtcca | ggaatatggc | 3780 |
| aattagattg  | cacacatcta  | gaaggaaaag  | tcattatagt  | agcagtccat | gtagccagtg | 3840 |
| gctatataga  | agcagaagtt  | atcccagcag  | aaacaggaca  | ggagacagca | tacttcctgc | 3900 |
| taaaattagc  | aggaagatgg  | ccagtaaaaag | taatacacac  | agacaatggc | agcaatttca | 3960 |
| ccagtgtctg  | aatgaaagca  | gcctgttggt  | gggcaaatat  | ccaacaggaa | tttggaattc | 4020 |
| cctacaatcc  | caaagccaa   | ggagtatggg  | aatctatgaa  | taaagaatta | aagaaaatta | 4080 |
| tagggcaggt  | cagggatcaa  | gctgaacacc  | tcaagacagc  | agtacagatg | gcagtattca | 4140 |
| ttcacaattt  | taaaagaaaa  | ggggggattg  | gggggtacag  | tgcaggggaa | agaataatag | 4200 |
| acataatagc  | atcagatata  | caaactaaaag | aactacaaaa  | acagattata | aaaattcaaa | 4260 |
| attttcgggt  | ctattacagg  | gacagcagag  | accccatttg  | gaaaggacca | gcaaaactac | 4320 |
| tctggaaaagg | tgaaggggca  | gtagtaatac  | aggacaatag  | tgagataaag | gtagtaccaa | 4380 |
| gaagaaaagt  | aaaaatcatt  | aaggattatg  | gaaaacagat  | ggcaggtggg | gattgtgtgg | 4440 |
| caggtagaca  | ggatgaggat  | tagaacatgg  | aacagtttag  | taaaatatca | tatgtataaa | 4500 |
| tctaagaaaag | ctaaggattg  | gttttataga  | catcactatg  | aaagtaggca | tccaaaagta | 4560 |
| agttcagaag  | tacacatccc  | actaggggag  | gctagattag  | tagtaagaac | atattggggg | 4620 |
| ctgcatacag  | gagaaagaga  | ctggcacttg  | ggtcaggggg  | tctccataga | atggaagcag | 4680 |
| agaagatata  | gcacacaaat  | agatcctgac  | ctagcagacc  | aactgattca | cctgcattat | 4740 |
| tttaactgtt  | tttcagaatc  | ggccgtaagg  | aaagccatac  | taggagaagt | agttagacct | 4800 |
| aggtgtgaat  | atcaaacagg  | acataatcag  | gtaggatcac  | tacaatat   | agcactcaaa | 4860 |
| gcattagtaa  | caccaacaca  | gacaaagcca  | cctttaccta  | gtgttaagaa | gttaacagaa | 4920 |
| gatagatgga  | acgagcccca  | gaagaccagg  | ggccacagag  | ggagccattc | aacgaatgga | 4980 |
| cactagaact  | gttagaagaa  | cttaaacatg  | aagctgttag  | acatggcttc | atggattagg | 5040 |



acaacatatt tataacacct atgggggatac ttgggaagga gttgtagcta taataagaat 5100  
 attgcaacaa ctacttttta ttcatttcag aattgggtgt caacatagca gaataggcat 5160  
 tattccaggg agaagaggca ggaatggagc tggtagatcc tagcctagag ccctggaacc 5220  
 acccaggaag tcagcctaca actgcttgta acaaatgtta ctgtaaaata tgctgctggc 5280  
 attgccaaatt gtgctttctg aacaagggtc taggcatctc ctatggcagg aagaagcgg 5340  
 gacgccgacg aggaactcct cagagtcacc aggatcatca aaatcctgta ccaaagcagt 5400  
 gagtagtaat agttagtata tgtgatgcaa tccttagaaa tagctgcaat agcaggacta 5460  
 gtagtagcag ccatagcagc catagtgtgtg tggaccatag aaaaataaag aaacaggaga 5520  
 aaatagacag gttacttgat agaataagag aaagagcaga agatagtggc aatgagagt 5580  
 aaggggacac agaggaattg gcaacacttg tggacatggt ggactttgat ccttgggttg 5640  
 gtgataattt gtagtgctc aaataacttg tgggtcacag tctattatgg ggtaccagt 5700  
 tgggaagacg cagatacccc tctattttgt gcatctgatg ctaaagcata tagtactgaa 5760  
 agacataatg tctgggccac acatgcctgt gtaccacag accccaacc acaagagata 5820  
 actctggaat atgtaacaga aacttttaac atgtggaaaa ataacatggt agaacagatg 5880  
 catgaggata taatcagttt atgggatgaa agcctaaagc catgtgtaaa gctaaccct 5940  
 ctctgtgtta ccttaactg tactaatgtc aattgtaaca gtaatgtgac cagcactggg 6000  
 aacagtgtg ggaccaacgc tacgtgtaac atagaagaag caaacaactt aaaaaactgc 6060  
 tctttcaata taaccacaga aataagagat aagaaaaaga cagaatatgc gcttttctat 6120  
 agacttgatg tgggtaccaat cgatggtaat aataatgtct caaataacta taggctaata 6180  
 aattgtaatg tctcaaccat taaacaagct tgtccaaagg tgtcttttga cccacttccc 6240  
 atacattatt gtgctccagc tgggtttgag attttaaagt gtaggggtaa gaatttcact 6300  
 ggaacaggac aatgtaaaaa tgtcagttca gtacaatgta cacatggaat taaaccagt 6360  
 gtatcaactc aattactact aaatggtagt ctagcagaag gagaaatagt aattagatct 6420  
 gaaaacctca cagacaatgc caaagtcata atagtacagc ttaataaaac tataggaatt 6480  
 aattgtacca gaccaacaa caatacaaga aaaagtataa gaatcggacc tggacaagcg 6540  
 ttctatgcaa caggtgaaat aataggacaa gaatggcagg agatgttaca gaaggtagc 6600  
 gcacaactag aacaggtctt taacaaaagt ataaccttta actcatccgc aggaggggac 6660  
 ctagaaatta caacacatag ttttaattgt agaggagaat ttttctattg taatacatca 6720  
 ggattgttta atgaatcagg agggaatgat accactatca cactcccatg taagataaaa 6780  
 caaattgtga gaatgtggca gagagtggga caagcaatgt atgcccctcc catcgagga 6840  
 gatattacat gtagatcaaa cattacaggc ctattattaa caagagatgg tgggggtta 6900  
 aatactggaa atgagacctt cagacctgga ggaggagata tgagggacaa ttggagaagt 6960  
 gaattatata agtataaaat agtaaaaatt aaacctactg gaatagcacc caccaaggca 7020  
 aggagaagag tgggtggagag aggaaaaagg gcagttggac tgggagctgt cttccttggg 7080  
 ttcttaggag cagcaggaag cactatgggc gcgggggtcaa taacgctgac ggtacaggtc 7140  
 agacaattat tgtctggcat agtgcaacag caaagcaatt tgctgagggc tatagaggcg 7200  
 cagcaacatc tattgcaact cacagtctgg ggcattaaac agctccaggc aagagtcctg 7260  
 gctgtagaaa gatacctaaa ggatcaacag ctcttaggga tttggggctg ctctggaaaa 7320  
 ctcatctgca ccactaatgt gccttggaac actagttgga gtaataaatc ttatgaggag 7380  
 atttgggata acatgacctg gatacaatgg gaaagggaag tcagcaatta cacacaacaa 7440  
 atatacagcc taattgaaga atcgagaaac cagcaggaaa agaatagaac agacttattg 7500  
 gcattggaca agtgggcaag tttgtggaac tgggttgaca taacaaaatg gctatggtat 7560  
 ataaaaatat ttataatgat agtaggaggt ttaatatggt taagaatagt ttttgctgtg 7620  
 ctttctatag taaatagagt taggcaggga tactcacctt tgtcattcca gacccttacc 7680  
 caccaccaga gggaaaccga caggcccga agaatcgaag aaggaggtgg agagcaagac 7740  
 agagacagat cagtgcgctt agtgagcgga ttcttagcac ttgcctggga cgacctgcgg 7800  
 aacctgtgcc tcttcagcta ccaccgattg agagacttag tcttgattgc agcaggaca 7860  
 gcagaactcc tgagacgcag cagtctccag ggactgagac tgggggtggga gggcctcaaa 7920

|            |            |            |             |            |             |      |
|------------|------------|------------|-------------|------------|-------------|------|
| tatctgtgga | atctcctggt | gtattggggt | cggaactaa   | agaatagtgc | tattaatttg  | 7980 |
| attgatacaa | tagcaatagc | agtagctaac | tggacagata  | gggttataga | agtagcacia  | 8040 |
| ggagcttgta | gagctattct | caacatacct | agaaggataa  | gacaaggctt | ggaaagagct  | 8100 |
| ttgctataaa | ataggaggca | agtgggtcaa | aagtagcata  | gttggtatgg | ccgcggtaag  | 8160 |
| ggagagaata | agacaaaccc | ctccagcaga | aggagtagga  | gcagcacctc | aagacttagc  | 8220 |
| taggcatgga | gcaatcacia | gcagcaatac | agcaciaaact | aatcctgatt | gtgcctggct  | 8280 |
| agaagcacia | caggagaatt | cagaggtagg | ctttccagtc  | agacaacagg | tacctttgag  | 8340 |
| accaatgact | tataaggctg | cctttgatct | cagcttcttt  | ttaaaagaaa | aggggggact  | 8400 |
| ggatgggcta | atttactcta | agaaaagaca | agacatcctt  | gacctatggg | tctataatac  | 8460 |
| acaaggatac | ttcccagatt | ggcagaacta | cactccaggg  | ccagggacta | gattcccact  | 8520 |
| gacatttcgg | tgggtgcttc | aactagtacc | aatggatcca  | gcagagatag | aggaagccaa  | 8580 |
| taaaggagag | aacaacagtt | tattacaccc | tatctgccaa  | catggcctgg | aagatgcgga  | 8640 |
| cagagaagtg | ctggtatgga | gatttgacag | tagcctagca  | cggagacaca | tagccccgaga | 8700 |
| acaacatccg | gagtactata | aggactgctg | acacagaagt  | tgctgacaca | gatgttgctg  | 8760 |
| acaaggggac | tttccgcctg | ggactttccg | gggaggcgcg  | gcatgggagg | gactggggag  | 8820 |
| tggctaacc  | tcagaagctg | catataagca | gccgttctc   | gcctgtactg | ggtctctctt  | 8880 |
| gtagaccag  | atttgagcct | gggagctctc | tggctagcag  | gggaaccac  | tgcttaagcc  | 8940 |
| tcaataaagc | ttgccttgag | tgcttc     |             |            |             | 8966 |

<210> 6

<211> 8954

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR029; 142..1579:gene="gag";  
1437..4448:gene="pol"; 4393..4971:gene="vif";  
4911..5201:gene="vpr"; 5182..7782:gene="tat";  
5321..7972:gene="rev"; 5586..8114:gene="env";  
8116..8736:gene="nef"

<400> 6

|            |            |            |             |             |            |     |
|------------|------------|------------|-------------|-------------|------------|-----|
| ctgaaagcga | aagtagaacc | agaggagctc | tcttgacgca  | ggactcggct  | tgctgaagcg | 60  |
| cgcacggcag | gaggcgagg  | gcggcgactg | gtgagtacgc  | caaaaataaa  | atttgacta  | 120 |
| gcggaggcta | gaaggagaga | gatgggtgcg | agagcgtcag  | taataagcgg  | gggagaatta | 180 |
| gataaatggg | aaaaaattag | gttaaggcca | ggaggacata  | aaaaatatag  | attaaaacat | 240 |
| atagtatggg | caagcagggg | agctagaacg | attcgcagtt  | aatcctggcc  | ttttagagac | 300 |
| atcagaaggc | tgtagacaaa | tactggaaca | gctacaacca  | gcccttaaga  | cgggatcaga | 360 |
| agaacttaga | tcattatata | atacagtagc | aaccctctat  | tgtgtacatc  | aaaagataga | 420 |
| tgtaaaagac | accaaggaag | ctttagaaaa | gatagaggaa  | gagcaaaaaca | aagtaagaaa | 480 |
| aaggcacagc | aagcagcagc | taacacagga | aacaacagcc  | aggtcagcca  | aaattaccct | 540 |
| atagtgcaga | accttcaggg | gcaaatggta | caccaggcca  | tatcacctag  | aactttaaat | 600 |
| gcatgggtaa | aagtagtaga | agagaaggct | tttagcccag  | aagtaatacc  | catgttttca | 660 |
| gcattatcag | aaggagccac | cccacaagat | ttaaacacca  | tgctaaacac  | agtgggggga | 720 |
| catcaagcag | ctatgcaaat | gttaaaagaa | accatcaatg  | aggaagctgc  | agaatgggac | 780 |
| agagtacatc | cagtgcattg | aggacctatc | ccaccaggcc  | agatgaggga  | acctagggga | 840 |
| agtgatatag | ctggaactac | tagtaccttc | caggaaacaaa | tacaatggat  | gacaagcaac | 900 |
| ccacctgtcc | cagtgggaga | aatttataaa | agatggatca  | tcctaggatt  | aaataaaata | 960 |

|            |            |             |            |             |            |      |
|------------|------------|-------------|------------|-------------|------------|------|
| gtaagaatgt | atagccctac | cagcattctg  | ggcataagac | aaggaccaa   | ggaacccttt | 1020 |
| agagactatg | tagatcgatt | ttataaaact  | ctaagagcag | agcaaacttc  | acaggatgta | 1080 |
| aaaaattgga | tgacagaaac | cttggttggtc | caaaatgcga | accagattg   | caaaaccatt | 1140 |
| ttaaaagcat | tggaaccagc | agctacacta  | gaagaaatga | tgacagcatg  | tcagggagtg | 1200 |
| gggggacccg | gccataaagc | aagagtttttg | gcagaagcaa | tgagccaagt  | aacaaattca | 1260 |
| ggtaccataa | tgatgcagag | aggcaattttt | aggaaccaa  | gaaagactat  | taagtgtttc | 1320 |
| aattgtggca | aagaagggca | catagccaaa  | aattgcaggg | cccctaggaa  | aaagggctgc | 1380 |
| tggaaatgtg | gaaaggaagg | acaccagatg  | aaagattgta | ctgagagaca  | ggctaatttt | 1440 |
| ttagggaaaa | tctggccttc | ccacaaggga  | aggccaggga | atttccttca  | gagcagacca | 1500 |
| gagccaacag | ccccaccagc | agagagcttc  | aggtttgggg | aagaggtaac  | aactccctct | 1560 |
| cagaaacagg | agccgataga | caaggagatg  | tatccttttg | cttccctcag  | atcactcttt | 1620 |
| ggcaacgacc | cctcgtcaca | gtaaagatag  | gggggcaact | aaaggaagcc  | ctattagata | 1680 |
| ccggagcaga | tgatacagta | ttagaagaaa  | taaatttacc | aggaagatgg  | aaacaaaaa  | 1740 |
| tgataggggg | aattggaggt | tttatcaaa   | taagacagta | tgatcaaata  | cccatagaaa | 1800 |
| tttgtggacg | taaagctaca | ggtacagtat  | tagtaggacc | tacacctgtc  | aacataattg | 1860 |
| gaagaaatct | gttgactcag | attggctgca  | ctttaaat   | tccattagt   | cctattgaaa | 1920 |
| ctgtaccagt | aaaattgaag | ccaggaatgg  | atggcccaag | ggttaaaca   | tggccattga | 1980 |
| cagaagaaaa | aataaaagca | ttaacagaaa  | tatgtacaga | aatggaaaa   | gaaggaaaa  | 2040 |
| tttcaaaaat | tgggcccga  | aatccataca  | atactccagt | atttgccata  | aagaaaaaag | 2100 |
| atagtactaa | atggagaaaa | ttagtagatt  | tcagagaact | taataagaga  | actcaagact | 2160 |
| tctgggaagt | tcagttagg  | ataccacatc  | ccgcagggtt | aaagaagaaa  | aatcagtaa  | 2220 |
| cagtactgga | tgtgggtgat | gcatatttt   | cagttccatt | agataaagac  | ttcaggaagt | 2280 |
| atactgcatt | taccatacct | agtacaaaaca | atgaaacacc | agggttaga   | tatcagtaca | 2340 |
| atgtgcttcc | acaggggtg  | aaaggatcac  | cagcaatatt | caaagtagc   | atgacaaaa  | 2400 |
| tcttagagcc | ttttagaaaa | caaaatccag  | acatagttat | ctatcaatac  | atggatgatt | 2460 |
| tgtatgtagg | atctgactta | gaaatagggc  | agcatagaac | taagatagag  | gaattgagac | 2520 |
| agcatttgtt | gaggtgggga | tttaccacac  | cagacaaaa  | acatcagaaa  | gaacctccat | 2580 |
| tcctttggat | gggttatgaa | ctccatcctg  | ataaatggac | agtacagcct  | atagtgtctg | 2640 |
| cagaaaaaga | cagctggact | gtcaatgaca  | tacagaagtt | agtgggaaaa  | ttgaattggg | 2700 |
| caagtcagat | ttatgcagg  | attaaagtaa  | ggcaattatg | taaactcctt  | aggggaacca | 2760 |
| aagcactaac | agaagtagta | ccactaacag  | cagaggcaga | gctagaactg  | gcagaaaaa  | 2820 |
| gggagattct | aaaagaacca | gtacatggag  | tgtattatga | cccctcaaaa  | gacttaatag | 2880 |
| cagaaataca | gaaacagggg | caaggccaat  | ggacatatca | aatttatcaa  | gagccatata | 2940 |
| aaaatttgaa | aacaggaaa  | tatgcaagga  | tgaggggtgc | ccacactaat  | gatgtaaaac | 3000 |
| aactaacaga | ggcagtgcaa | aaaataacca  | cagaaagcat | agtaatatgg  | ggaaagattc | 3060 |
| ctaaatttaa | actaccata  | caaaaagaaa  | cgtgggaagc | atggtggata  | gagtattggc | 3120 |
| aagccacctg | gattcctgag | tgggagtttg  | tcaatacccc | tcccttagtg  | aaattatggg | 3180 |
| accagttaga | gaaagaaccc | atagtaggag  | cagaaacttt | ctatgtagat  | ggggcagcta | 3240 |
| atagggaaac | taaattagga | aaagcaggat  | atgtgactga | cagaggaaga  | caaaaagttg | 3300 |
| tccccctaac | ggacacaaca | aatcagaaaa  | ctgagttaca | agcaattcat  | ctagctttgc | 3360 |
| aggattcggg | attagaagta | aacatagtaa  | cagactcaca | atatgcatta  | ggaatcattc | 3420 |
| aagcacaacc | agataagagt | gaattagaaa  | tagtcaatca | aataatagag  | cagttaataa | 3480 |
| aaaaggaaaa | gatctacctg | gcatgggtac  | cagcacacaa | aggaattgga  | ggaaatgaac | 3540 |
| aagtagacaa | attagtcagt | tctggaatca  | ggaaagtact | atTTTTtagat | ggaatagata | 3600 |
| aggccaaga  | agaacatgag | aaatatcaca  | ataattggag | agcaatggct  | agtgacttta | 3660 |
| acataccacc | tgtagtagca | aaagaaatag  | tagccagctg | tgataaatgt  | cagctaaaag | 3720 |
| gagaagccat | gcatggacaa | gtagactgta  | gtccaggaat | atggcagcta  | gattgtacac | 3780 |
| acttagaagg | aaaagttatc | ctggtagcag  | tgcatgtagc | cgggtggatat | atagaagcag | 3840 |

aagttattcc agcagagaca gggcaagaaa cagcatactt tctcttaaaa ttagcaggaa 3900  
gatggccagt aaaaacaata cacacagaca atggcagcaa tttcaccagt actacagtca 3960  
aggccgcctg ttggtgggcg gggatcaagc aggaatttgg cattccctac aatcccaaaa 4020  
gtcaaggagt aatagaatct atgaataaag aattaaagaa aattatagga caggtaaggg 4080  
atcaggctga acatcttaag acagcagtag aaacggcagt attcatccac aattttaaaa 4140  
gaaaaggggg gattgggggg tacagtgcag gggaaagaat agtagacata atagcaacag 4200  
acatacagac taaagaatta caaaaacaaa ttacaaaaat tcaaaatttt cgggtttatt 4260  
acagagacag cagagatcca ctttggaag gaccagcaaa gcttctctgg aaaggtgaag 4320  
gggcagtagt aatacaagat aatagtgaac taaaagtagt gccaagaaga aaagtaaaga 4380  
tcattagggg ttatggaaaa cagatggcag gtggtgattg tgtggcagg agacaggatg 4440  
aggattaaca catggaaaag tttagtaaaa taccatattg atgtttcaaa gaaagccaaa 4500  
agatggtttt atagacatca ctttgaaagc aggcattcaa gagtaagttc agaagtacat 4560  
atcccactag aggaagctaa attagtaata acaacatatt gggggctgca tacaggagaa 4620  
agagattggc atctgggtca gggagtctcc atagaatgga ggcaggggag gtataggaca 4680  
caaataagacc ctggcctggc agaccaactg atccatatat attattttga ttgtttttca 4740  
gaatctgcca taaggaaagc catattagga catagaatta gccctagggtg tgattatcaa 4800  
gcaggacata acaaggtagg atctctacag tacttggcac taacagcatt aataaaacca 4860  
aaaaagagaa agccaccttt gcccagtggt aagaaaactga cagaggatag atggaacaag 4920  
ccccagaaga ccaaggacca cagagggagc catacaatga atggacacta gaacttttag 4980  
aggaacttaa gagtgaagct gttagacatt ttcctagggt atggctccat agcttaggac 5040  
aacatatcta tgaaacttat ggggatactt gggcaggagt ggaagccata ataagaattc 5100  
tgcaacaact gctgtttatt catttcagaa ttggatgtca acatagcaga ataggcatta 5160  
atcgacagag gagagcaagg aatggagcca gtagatccta gactagagcc ctggaagcat 5220  
ccaggaagtc ggcctcagac ggcttgtaat agttgctatt gtaaaaagtg ttgctttcat 5280  
tgtcaagttt gtttcacaac aaagggttga ggcattctct atggcaggaa gaagcggaga 5340  
cagcgacaca gaactcctca aagcagtcag ctacatcaag atcctgtacc aaagcagtaa 5400  
gtattgttaa gtaatatatg taatgtcata tttgttagta ataggtttag cagcattaat 5460  
agcagcacta ataatagcaa tagttgtgtg gactatagca tatatagaat atagggaact 5520  
agtaaggcaa agaaaaataa atagggtata taaaagaata agagaaagag cagaagacag 5580  
tggaatgag agtgaggggg atgcagagga attggcagca cttggggaaa tggggccttt 5640  
tattcctggg gatattgata atctgtaatg ctgaaaactt gtgggtcaca gtctattatg 5700  
gggtacctgt gtggaaagaa gcaaccacta ctttattctg tgcacagat gctaaagcat 5760  
atgaaaaaga agcacataat gtctgggcta cacatgcctg tgtaccaca gatcccaatc 5820  
cacaagaagt agttctggaa aatgtaacag aaaattttga tatgtggaaa aataacatgg 5880  
tagaacaat gcatacagat ataatacagtt tatgggatca aagcctgaag ccatgtgtga 5940  
agttaacccc actctgtgtt actttacggt gtagtaatgc cactaccaac agtactcaa 6000  
acgacaccct gaaggaagag ccaggggcaa tacaaaactg ttctttcaat atgaccacag 6060  
aagtaagaga taagcagctg aaagtacatg cactttttta taggcttgat atagtacaa 6120  
tcagcaatga taatagtagc aatgataata gtagcagaga atacaggcta ataaattgta 6180  
atacctcaac ccttacacag gcttggtcaa aggtatcttg ggatccaatt ccatacatt 6240  
attgtgctcc agctgggtat gcgattctaa agtgtaatga taaaaaattc aatgggacgg 6300  
ggccatgcag gaatgtcagc acagtacaat gtacacatgg aattaaacca gtggtatcaa 6360  
ctcaattggt gttaaattggc agcctagcag aaaaagatat aataatcaga tctcaaaaata 6420  
tctcagataa tgcaaaaacc ataatagtac aacttaattg atctgtgccg attaatgtga 6480  
caagacccaa caacaatata agaaaaagta taccaatagg accaggacga gcattttata 6540  
caacaggaga aataatagga gacatcagaa aggcacattg taacgttagt ggaacaaaat 6600  
ggaatgagac gttagaaaag gtaagggcaa agttaagcc tcatttccct aatgcaacaa 6660  
taaaatttaa ctcatcctca ggaggggacc tagaaattac aatgcatagt tttaattgta 6720

gaggagaatt tttctactgc aatacatcag gactgtttta tgacacagta gacaatggca 6780  
 ctatcactct cccatgtcga ataaagcaaa ttgtaaatat gtggcaggaa gtggggcgag 6840  
 caatgtatgc cgctcccatt gcaggaaaca ttacctgtag ctcaaattatt acaggtctac 6900  
 tattgacaag agatgggtgt cagaataatc agacggagga gaccttcaga cctgggggag 6960  
 gaaatatgaa agacaactgg agaagtgaat tatataaata taaagtagta gaaattgagc 7020  
 cattaggagt agcaccacc aaggcaaaaa gacaagtgtt gaagagagaa aaaagagcag 7080  
 tgggaatggg agctttgttc cttgggttct tgggagcagc aggaagcact atgggcgag 7140  
 cgtcaataac gctgacggca caggccagac aattattgtc tggcatagtg caacagcaga 7200  
 ataattttgct gagggctatt gaagcgcaac agcatctgtt gcagctcaca gtctggggca 7260  
 ttaaacagct ccaggcaaga atcctggctg tggaaagata cctaaaggat caacagctcc 7320  
 tagggctttg gggctgctct ggaaaactca tctgcaccac tgatgtgccc tggaaactcta 7380  
 gttggagtaa caaatctcag gagaagatct gggggaacat gacctggatg gagtgggaaa 7440  
 aagagattag caattactca aacgaaatat atagggttaat tgaagagtcg cagaaccagc 7500  
 aggaaaagaa tgaacaagaa ttattggcat tggacaaatg ggcaagtctg tggaaattggt 7560  
 ttgacatatc aaaatggctg tggatatata aaatattcat aatgatagta ggaggcttga 7620  
 taggcttaag aatagttttt gctgtgcttt ctatagtaaa tagagttagg aagggatact 7680  
 cacctttgtc attacagacc cgcttcccaa gcccaaggga acccgacagg cccgaaggaa 7740  
 tcgaagaagg aggtggagag ccaggcaaaag acagatccgt gagattagtg aacggattct 7800  
 tagctcttgt ctgggacgac ctgaggaacc tgtgcctctt cagctaccgc cacttgagag 7860  
 acttcatatt aattgcagcg aggatttgtg acaggggact gaagaggggg tgggaagccc 7920  
 tcaaacttct ggggaatctc gcgctgtatt ggagtcagga actaaagaat agtgctatta 7980  
 gcttgcttaa taccacagca atagtagtag ctgaggggac agatagagtt atagaagctt 8040  
 tgcaaagagc gggtagagct gttcttaacg tacctagaag aataagacag ggcttggaaa 8100  
 gggctttgct ataaaatggg tagcaagtgg tcaaaaagta gtatagttgg gtggcctgct 8160  
 ataagggaaa gattaagaca aaccctcca gcagcagaag gggtagggagc agtgtctcaa 8220  
 gacttagaaa gacggggggc aattacaagc agcaatactg gagctaataa tcctgacttg 8280  
 gcctggctgg aggcacaaga ggaagaggaa gtaggctttc cagtcagacc tcaggtaacct 8340  
 ttaagaccaa tgacttataa gggagctctt gatctcagtc acttttttaa agaaaagggg 8400  
 ggactggaag ggttaattta ttccaagaaa agacaagaga tccttgatct gtgggtttac 8460  
 cacacacaag gctacttccc tgattggcag aactacacac cagggccagg gaccagatat 8520  
 ccactgacct taggggtgtg cttcaagcta gtaccagttg acccagagga ggtagaaaag 8580  
 gccaatgaag gagagaacaa ctgcttgcta caccatga gccaacatgg aatggaggat 8640  
 gaagacagag aaatactgca gtggaggttt gacagccgcc tagcatttca tcacatggcc 8700  
 cgagagctgc atccggagta ctacaaggac tgctgacatt gagttttcta caagggactt 8760  
 tccgctgggg actttccagg gaggtgtggc ctgggcggga ctggggagtg gcgagccctc 8820  
 agatgctgca tataagcagc tgctttctgc ctgtactggg tctctctggt tagaccagat 8880  
 ttgagcctgg gagctctctg gctagctagg gaacctactg cttaagcctc aataaagctt 8940  
 gccttgagtg ctta

8954

<210> 7

<211> 9050

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate="94CY032.3"; 156..1658:"gag";  
 1454..4462:"pol"; 4407..4985:"vif";  
 4925..5212:"vpr"; 5200..7842:"tat";

5339..8026:"rev"; 5435..5680:"vpu";  
5598..8168:"env"; 8170.8829:"nef"

<400> 7

```
ttgaaagtga aagttaatag gactcgaaag cgaaagttcc agagaagttc tctcgacgca 60
ggactcggct tgctgaggtg cacacagcaa gaggcgagag cggcgactgg tgagtacgcc 120
aaatTTTTTg actagcggag gctagaagga gagagatggg tgcgagagcg tcagtattaa 180
gtgggggaaa attagatgca tgggagagga ttcggttaag gccaggggga aagaaaaaat 240
atagactgaa acatctagta tgggcaagca gagagttgga aagattcgca cttaaccctg 300
gccttttaga aacagcagaa ggatgtcaac aattaatgga acagttacaa tcaactctca 360
aaacaggatc agaagaactt agatcattat ataatactat aacaaccctc tgggtgcgtac 420
atcaaagaat agatgtacaa gacaccaagg aagctttaga taaaatagag gaaatacaaa 480
gtaagagcaa gcaaaagaca cagcaggcag cagctgccgc aggaggtagc agcaatgtca 540
gccaaaatta ccctatagtg caaatgcac aaggggcaaat ggtacatcag agcatttcac 600
ctagaacttt gaatgcatgg gtaaaagtaa tagaagaaaa ggctttcagc ccagaagtaa 660
tacctatggt ctcagcatta tcagagggag ccaccccaac agatttgaac atgatgctaa 720
atatagtggg gggacaccag gcagcaatgc aaatgttaaa agataccatc aatgaggaag 780
ctgcagactg ggacaggaca catccagtac atgcagggcc tattccacca ggccagatga 840
gagaaccaag gggaaagtga atagcaggaa ctactagtag ccttcaagaa caaataggat 900
ggatgacaag caaccacct gtcccagtgg gagaaatcta taaaagatgg ataactttgg 960
ggtaaataa aatagtaaga acgtatagcc ccattagcat cttggacata agacaaggac 1020
caaaagaacc cttcagagat tatgtagata ggttctttta atgtctcaga gcagaacaag 1080
ctaccagga ggtgaaaaat tggatgacag aaaccctgct ggtccaaaat gcgaatccag 1140
actgtaagtc catcttaaaa gcattaggaa caggggctac attagaagaa atgatgacag 1200
catgtcaggg agtgggagga cccagccata aagcaagagt tttagctgag gcaatgagcc 1260
aggcatcaaa tgcagcagca gccataatga tgcagaaaag caaatttaag ggccaaagaa 1320
gaactattaa gtgtttcaac tgtggcaagg aaggacatct agccagaaat tgcaggggcc 1380
ctaggaaaaa gggctgctgg aagtgtggaa aggagggaca tcaaatgaaa gactgcactg 1440
agagacaggc taatTTTTTt gggagaatgt ggccttcag caaaggagg ccaggaaaatt 1500
ttcttcagaa caggccagag ccaacagccc cgcccgcgga atgcttagag aggaaagagg 1560
agacaacctc ctctctgaag caggaaccga gggacaagga actatatcct ttaacttccc 1620
tcaaatcact ctttggcagc gacccttgt cacaataaaa ctaggggggac agataaggga 1680
ggctctttta gatacaggag cagatgatac agtattagaa gaaataaatt tgccaggaaa 1740
atggaagcca aaaatgatag ggggaatcgg aggtttttatc aaagtaagac aatatgatca 1800
gatacctata gaaatttgtg gaaaaaaggc cataggcaca gtgttagtag gacctacacc 1860
tgtcaacata attggacgaa acatgttgac tcagcttggt tgtactttta attttccaat 1920
tagtcctatt gaaactgtac cagtaaaatt aaagccagga atggatggcc caaaggttaa 1980
acaatggcca ttgacagaag aaaaaataaa agccttaaca gagatatgta cagacatgga 2040
aaaggaaggc aagatttcaa aaattgggcc tgaaaatcca tacaatactc caatatttgc 2100
tataaagaaa aaagacagca ctaaatggag aaaattagta gatttcagag aactcaataa 2160
aagaactcag gacttctggg aagttcagtt aggaataccg caccagcag ggttaaagaa 2220
gaaaaaatca gtaacagtat tggatgtggg ggatgcatat ttttcagttc ccttagatcc 2280
agagttcagg aagtacactg cattcaccat acctagtacc aacaatgaga caccaggaat 2340
tagatatcag tacaatgtgc ttccacaggg ctggaaagga tcaccagcaa tattccaatg 2400
tagcatgaca aaaatcttag agccctttag attcaaaaac ccagaaatag tcatatacca 2460
atatatggat gatttgtatg tagggctga cttagaaata gggcaacata gagcaaaaat 2520
agaagagcta agagagcatc tattgagatg gggattcacc acaccagaca aaaaacatca 2580
gaaagaaccc ccatttcttt ggatggggta tgaactccat cctgacaaat ggacagtgca 2640
```

|             |             |            |            |             |             |      |
|-------------|-------------|------------|------------|-------------|-------------|------|
| gcctatacaa  | ccggcagaaa  | aggatagctg | gactgtcaac | gatatccaga  | agttagtggg  | 2700 |
| aaaactaaat  | tgggcaagtc  | agatttatcc | agggattaaa | gtaaagcaat  | tatgtaaact  | 2760 |
| tcttagggga  | gctaaagccc  | taacagacat | agtaccacta | actacagagg  | cagagttaga  | 2820 |
| attagcagag  | aacagggaga  | ttctaaaaga | accagtacat | ggggcatatt  | atgacccatc  | 2880 |
| aaaagactta  | atagcagaaa  | tacagaagca | agggcaaggt | caatggacat  | atcaaataata | 2940 |
| tcaagagcca  | cataaaaatc  | tgaaaacagg | gaagtatgca | agaaccagat  | ctgcccacac  | 3000 |
| taatgatgtt  | agacaattaa  | cagaagcagt | gcaaaagata | gccatggaat  | gcatagtaat  | 3060 |
| atggggaaaag | actcctaagt  | ttagattacc | catacaaaag | gaaacatggg  | acacatggtg  | 3120 |
| gacagaatat  | tggcaggcca  | cctggatccc | tgaatgggaa | tttgtcaata  | cccctcctct  | 3180 |
| agtaaaatta  | tggtagcagt  | tagaaacaga | ccccatagca | ggagcagaaa  | ctttctatgt  | 3240 |
| agatggggca  | gctaatagag  | aaacaaaaca | gggaaaagca | ggatatgtta  | ctgatagagg  | 3300 |
| cagacaaaaa  | gttgtctccc  | tatctgaaac | aacaaatcag | aagactgaat  | tacaagcaat  | 3360 |
| ttacttagct  | ttgcaggatt  | caggatcaga | agtaaacata | gtaacagact  | cacagtatgc  | 3420 |
| aataggaatc  | attcaagcac  | aaccagatag | aagtgaatca | gatttagtta  | atcaaataat  | 3480 |
| agagcagtta  | atacggaagg  | acaaggtcta | cctgtcatgg | gtaccagcac  | acaaagggat  | 3540 |
| tggaggaaaat | gaacaagtag  | ataaattagt | cagcaatgga | atcagaaagg  | tgctattttt  | 3600 |
| agatggaata  | gataaggctc  | aagaagaaca | tgagaaatat | cacaataact  | ggagagcaat  | 3660 |
| ggctagtgat  | tttaatctgc  | catcagtggg | agcaaaagag | atagtagcta  | gctgtaataa  | 3720 |
| atgtcagcta  | aaaggggaag  | ccatgcatgg | acaagtggac | tgtagtccag  | ggatatggca  | 3780 |
| gttagattgt  | acacatttag  | aaggtaaagt | tatcatggta | gcagttcatg  | tggctagtgg  | 3840 |
| atacatagaa  | gcagaagtta  | tcccagcaga | aacaggacag | gaaacagcct  | acttcatact  | 3900 |
| aaaattagca  | ggaagatggc  | cagtgaaaat | gatacatgca | gacaacggcc  | ccaatttcac  | 3960 |
| cagtgtctgc  | gttaaggcag  | cctgttggtg | ggcagatata | aaccaggaat  | ttggaattcc  | 4020 |
| ctacaatccc  | caaagccaag  | gagtagtgga | atctatgaat | aaagaattaa  | agaaaatcat  | 4080 |
| agggcaggtc  | agggatcaag  | ctgaacacct | taagacagca | gtacagatgg  | cagtattcat  | 4140 |
| tcacaatttt  | aaaagaaaag  | gggggattgg | ggggtacagt | gcaggggaaa  | gaataataga  | 4200 |
| cataatagca  | tcagatatata | aaactaaaga | actacaaaaa | caaattacaa  | aaattcaaaa  | 4260 |
| ttttcggggt  | tattacaggg  | acagcagaga | accaatttgg | aaggggaccag | caaaactact  | 4320 |
| ctggaaaagg  | gaaggggcag  | tagtaataca | ggacaacagt | gatatacaaag | tagtaccaag  | 4380 |
| aagaaaagca  | aagattatta  | gggactatgg | caaacagatg | gcaggtaatg  | atttgttggc  | 4440 |
| aggtagacag  | gatgaagatt  | agaacatgga | acagtctagt | gaaacatcat  | atgtatgttt  | 4500 |
| caaagaaagc  | taaaggatga  | ttctatagac | atcactatga | aagtaggcac  | ccaaaagtaa  | 4560 |
| gttcagaagt  | acatatccca  | ctaggggagg | ctagattagt | agtaagaaca  | tattggggtc  | 4620 |
| tgcagccagg  | ggaacaagac  | tggcacttgg | gtcatggagt | ctccatagaa  | tggaggctca  | 4680 |
| gaagatatag  | cacacaagtg  | gatcctgacc | tggcagacca | actaattcat  | atgcattact  | 4740 |
| ttgattgttt  | ttcagaatct  | gccataagga | aagccatatt | aggacataga  | gttagtccta  | 4800 |
| ggtgtgaata  | tcaagcagga  | cataataagg | taggatcctt | acaataacctg | gcactagcag  | 4860 |
| cattaatatc  | cccaaaaaag  | acaaagccac | ctttgcctag | tgtaaagaaa  | ctagtggagg  | 4920 |
| atagatggaa  | caagccccag  | aagaccaggg | gccgcagaga | gaaccaaata  | atgaatggac  | 4980 |
| actagagctt  | ttggaggagc  | ttaaaaatga | agctgttagg | cattttccta  | gaccctggct  | 5040 |
| ccatggccta  | ggacagcata  | tctataacac | ttatggagat | acctgggaag  | gggttgaagc  | 5100 |
| tataataaga  | attttgcaac  | aactactgtt | tattcatttc | agaattgggt  | gccaacatag  | 5160 |
| tagaataggc  | attactcctc  | aaaggagaag | aggcagggga | tggagccagt  | agatcctgac  | 5220 |
| ctagagccct  | ggaaccatcc  | gggaagtcag | cctacaactg | attgtaacaa  | gtgtttctgt  | 5280 |
| aaaaagtgtt  | gctggcattg  | ccaagtttgc | tttctgaaaa | aaggcttagg  | catctcctat  | 5340 |
| ggcaggaaga  | agcggaacaa  | tcgacgagga | tctcttcaag | gcagcaaggg  | ccatcaaaat  | 5400 |
| cttataccaa  | agcagtaagt  | attaagtata | tgtaatgtta | ttctgggaaa  | tctgggcaat  | 5460 |
| agtaggactg  | gtagtagcgc  | taattatagt | aatagtagtg | tggactttag  | tatttataga  | 5520 |

atataagaaa ttgagaaggc aaaggagaat agacagcttg tacaatagaa taagagaaaag 5580  
agcagaagac agtggcaatg agagtgatgg ggatgcagag gaattatcca cacttgtggg 5640  
aatggggaac tttgatcctt ggggttggtga taatctgtag tgcctcaaac aacttgtggg 5700  
tcacagttta ttatggggta cctgtgtgga gagacgcaga gaccacccta ttttgtgcat 5760  
cagaagctaa agcatatgag aaagaagtac ataatatctg ggctacacat gcctgtgtac 5820  
ccacagaccc caaccacaaa gaagtagctc tgataaatgt aacagagAAC tttAACatgt 5880  
ggaaaaatga catggtagaa cagatgcag aggatataat cagtttatgg aatgaaggcc 5940  
taaaaccatg tgcaaaagcta acctctctct gtgttacttt tacatgtatt aatgcaacta 6000  
ctactaatag taccaatggc actgtgatta aagaaggaat aaaaaactgc tctttcgata 6060  
taaccacaga aataagggat aagaagaaga aagaatatgc gcttttctat agaattgata 6120  
tagtgccaat taatgctaga gtgccaatta atggtagtaa taggaataat agtacagaag 6180  
agtatatgtt aataaattgt aacgcctcaa ccattaaaca ggcttgccca aagggtgtctt 6240  
ttgagccaat tcccatacat tattgtgccc cagctggttt tgcaatttta aagtgtaatg 6300  
agaaaaatth cactggatta gggccatgca caaatgtcag ctcggtacga tgcactcatg 6360  
gaattaagcc agtgggatca actcaattgc tgttaaattg aagcttagca acggaagagg 6420  
tagtaattag atctaaaaat atcacagaca ataccaaaaa tataatagta cagcttgcaa 6480  
aggctgtaaa aattaattgt accagacctg gcaacaatac aagaaaaagt gtacatatag 6540  
ggccaggact aacatgggat gcaacagggt aaataatagg agatataaga caagcacatt 6600  
gtaacattag tggaaatgat tggaaatgaca ccttaaaagt gataagtga gaattgaaaa 6660  
gactcttccc taataaaaaca ataaaatttg ctccaccctg aggaggggac ctagaatta 6720  
caacacatag ctttaattgt aaaggagaat ttttctattg caatacaaca cactgttta 6780  
atagtacaca catgcaaaat ggtacaaaaca ttacaagtac agattctaca aattcaacca 6840  
tcacactcca atgcagacta aaacaatttg taaggatgtg gcaggaagtg gggcaagcaa 6900  
tgtacgctc cccattgca gggagcatta actgcagctc agatattaca ggaataatat 6960  
tgacaagaga tgggtggtact aataatactg agatcttcag acctggagga ggagacatga 7020  
gggacaattg gagaagtga ctatataaat ataaagtgt aaagattga ccaataggag 7080  
tagcacccaa taaggcaagg agacgagtgg tgcagagaga aaatagca gtgggaatag 7140  
gggccatgtt ccttgggttc ttgggagcag caggaagcac tatgggcgca gcgtcaatga 7200  
cgctgacggg acaggccaga caattattgt ccggcatagt gcagcagcag agcaatttgc 7260  
tgagggctat agaggctcaa caacatctgt tgagactcac ggtctggggc attaaacagc 7320  
tccaggcaag agtcctggct ctggaaagct acctaaagga tcaacagctc ctaggaattt 7380  
ggggctgctc tggaaaactc atctgcacca ctaatgtacc ttggaactct agttggagta 7440  
ataaatctta taatgatata tgggacaata tgacctggtt gcaatgggat aaagaaatta 7500  
acaattacac acaataata tatgggttac ttgaagaatc acagaaccag caggaaaaga 7560  
atgagcaaga cttattggcc ttggacaagt gggcaagcct gtggaattgg tttagcataa 7620  
caaatggct atggtatata aaaatattta taatgatagt aggaggcttg ataggcttaa 7680  
gaataattht tgctgtgctt tctatagtaa atagagttag gcagggatac tcaccttgt 7740  
ctttgcagac cttatccca acaaccacac ggggactcga caggcccgga ggaacagaag 7800  
aagaagggtg cgagcaagac agaagcagat ccattcgctt agtgaacgga ttcttgccac 7860  
ttatctggga cgacctgcgg aacctgtgcc tcttcagcta ccgccacttg agaaacttac 7920  
tcttaattgt agcaggact gtggaacttc tggggataag ggggtgggaa gccctcaagt 7980  
atctgtggaa cttctgctg tattggggac aggagctaaa gaatagtgt attaattht 8040  
ttaataccac agcaatagca gtagctgagg gaacagatag gattatagaa gcagtacaga 8100  
gagctttag agctatttgc aacataccta gaagaatcag acaggccctt gaaagagctt 8160  
tgctttaaaa tgggaggcaa atggtcaaaa agtagcatag ttggatggcc tgagataagg 8220  
gaaagaatga ggcgagctcg agctgagcca gaaagaatga ggcgagctca agctgagcca 8280  
gcagcagcag gagtaggagc agtgtctcaa gacttggaac aacatggggc aatcacaatt 8340  
aacaatacag cagctactaa tcttgacaaa acctggctgg aagcacaaga agaggaagaa 8400



```

gaggtagggtt ttccagtcag gccacaggta cctttaaggc caatgacctt taaaggagct 8460
ttagatctca gccactttttt aaaagaaaaag gggggactgg atgggcta at tactccaag 8520
aaaagacaag agatccttga tctgtgggtc tatcacacac aagggtttctt ccctgattgg 8580
gataactaca caccaggacc aggggagaga ttccactgt gctttggatg gtgcttcaag 8640
ctagtaccag tagatccaca ggaggtggaa gaggccactg aaggagagaa cacctgtttg 8700
ctgcacccta taagccagca tggaatggag gatgaagaga gagaagtatt aaagtggaa 8760
tttgacagtc gcctggcata caagcacgta gcccagagagc tgcatccgga gttttacaaa 8820
gactgctgac acagaagttg ctgacaaaagg gactttccgc ccgggacttt ccaggggagg 8880
cgcggcctgg gaggggttgg ggagtggcta accctcagat gctgcataaa agcagccgct 8940
tctcgctgt actgggtctc tctggttaga ccagatctga gcctgggagc tctctggcta 9000
gctaggaac ccactgctta agcctcaata aagcttgctt tgagtgttc 9050

```

<210> 8

<211> 9010

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

```

<223> isolate=96ZM651; 137..1621:"gag";
      1426..4425:"pol"; 4370..4948:"vif";
      4888..5178:"vpr"; 5159..5373-7734..7824:"tat";
      5298..5373-7734..7981:"rev"; 5387..5647:"vpu";
      5565..8171:"env"; 8173..8793:"nef"

```

<400> 8

```

cttgaagcga aagtagacca gaggagatct ctcgacgcag gactcggctt gctgaagtgc 60
actcggcaag aggcgagagc ggcggctggt gagtacgcca aattttatatt gactagcggga 120
ggctagaagg agagagatgg gtgcgagagc gtcaatatta agaggggggaa aattagataa 180
atgggaaaaa attaggctaa ggccaggggg aaagaaacgc tatatgataa aacacctagt 240
atgggcaagc agggagctgg aaagatttgc gcttaaccct ggcttttag aaacatcaga 300
aggctgtaaa caaataatga aacagctaca accagctctt cagacaggaa cggaggaact 360
tagatcatta tacaacacag tagcaactct ctattgtgta catgaagggg tagaggtacg 420
agacaccaag gaagccttag acaggataga ggaagaacaa aacaaaattc agcaaaaaat 480
acagcaaaaa acacagcaag cggctgacgg aaaggtcagt caaaattatc ctatagtgcg 540
gaatctccaa gggcaaatgg tacaccagaa actatcacct agaactttga atgcatgggt 600
aaaagtaata gaagaaaaag cttttagccc agaggtaata cccatgttta cagcattatc 660
agaaggagcc accccacaag atttaaacac catgttaa atacagtggggg gacatcaagc 720
agccatgcaa atgttaaaa atactatcaa tgaggaggct gcagaatggg atagattaca 780
tccagtgcag gcagggccta ttgcaccagg ccaaatgaga gaaccaaggg gaagtgatat 840
agcaggaact actagtacc tccaagaaca gatagcatgg atgacaagta atccccctat 900
tccagtggga gacatctata aaagatggat aattctgggg ttaaataaaa tagtaagaat 960
gtatagccct gtcagcattt tggacataaa acaagggcc aaggaaccct ttagagacta 1020
tgtagaccgg ttcttcaaaa ctttaagagc tgaacaggct acacaagaag taaaaaattg 1080
gatgacagac accttgttgg tccaaaatgc aaaccagat tgcaagacca ttttaaaagc 1140
attaggacca ggggctacat tagaagaa atgatgacagca tgtcaaggag tgggaggacc 1200
tagccacaaa gcaagagtgt tggctgaggc aatgagccaa acaaatagtg taaacatact 1260
gatgcagaaa agcaatttta aaggaaataa aagaatggtt aaatgtttta actgtggtaa 1320
ggaagggcac atagccagaa attgcagggc ccctaggaaa aagggtgtt ggaaatgtgg 1380

```

|            |            |             |            |            |            |      |
|------------|------------|-------------|------------|------------|------------|------|
| aaaggagga  | caccaaataa | aagactgtac  | tgagaggcag | gctaattttt | tagggaaaat | 1440 |
| ttggccttcc | cacaagggaa | ggccagggaa  | tttccttcag | aacaggccag | agccaacagc | 1500 |
| cccaccagca | gagagcttca | ggttcgagga  | gacaaccccc | gctccgaagc | aggagtgcga | 1560 |
| agacagggaa | gccttaactt | ccctcaaata  | actctttggc | agcgaccctt | tgtctcaata | 1620 |
| aaggtagggg | gccaaataaa | ggaggctctc  | ttagacacgg | gagcaggtga | tacagtatta | 1680 |
| gaagaaataa | atttgccagg | caaattggaa  | ccaaaaatga | taggaggaat | tggaggcttt | 1740 |
| atcgaagtaa | gacaatatga | tcaaatacct  | atggaaattt | gtggaaaaaa | ggctataggt | 1800 |
| acagtattag | taggacctac | acctgtcaac  | ataattggaa | gaaatatgtt | gactcagctt | 1860 |
| ggatgcacac | taaattttcc | aattagtcct  | attgaaactg | taccagtaaa | attaaagcca | 1920 |
| ggaatggatg | gccc aaagg | t aaacaatgg | ccattgacag | aagagaaaat | aaaagcttta | 1980 |
| acagcaat   | gtgaagaaat | ggagaaggaa  | ggaaaaatta | caaaaattgg | gcctgaaaat | 2040 |
| ccatataaca | ctccagtatt | tgccataaaa  | aagaaggaca | gtactaagtg | gcgaaaatta | 2100 |
| gtagatttca | gggaactcaa | taaaagaact  | caagactttt | gggaagttca | attaggaata | 2160 |
| ccacaccag  | cagggttaaa | aaagaaaaaa  | tcagtgcag  | tactggatgt | gggggatgca | 2220 |
| tatttttcag | ttcctttaga | tgaaagcttc  | aggaaatata | ctgcattcac | catacctagt | 2280 |
| acaaacaatg | aaacaccagg | gattagatat  | caatataatg | tgcttcacac | gggatggaaa | 2340 |
| ggatcaccag | caatattcca | gagtagcatg  | acaaaaatct | tagagccctt | cagggcacaa | 2400 |
| aatccagaca | tagtcatcta | tcaatatatg  | gatgacctgt | atgtaggatc | tgacttagaa | 2460 |
| atagggcaac | atagagcaaa | aatagaagag  | ttaagagaac | atctattaaa | gtggggat   | 2520 |
| accacaccag | acaagaaaca | tcagaaagaa  | ccccatttc  | tttggatggg | gtatgaactc | 2580 |
| catcctgaca | aatggacagt | acagcctata  | cagctggcag | aaaaagatag | ctggactgtt | 2640 |
| aatgatatac | agaagttagt | gggaaaatta  | aactgggcaa | gtcagattta | cgcagggt   | 2700 |
| aaagtaaggc | aactttgtaa | actccttagg  | ggagccaaag | cactaacaga | catagtacca | 2760 |
| ctaactgaag | aagcagaatt | agaattggca  | gagaacaagg | aaattttaaa | agaaccagta | 2820 |
| catggggtat | attatgacct | atcaaaagac  | ttgatagctg | aaatacagaa | acaaggcat  | 2880 |
| gaccaatgga | catatcaaat | ttaccaggaa  | ccattcaaaa | atctgaaaac | aggggaagt  | 2940 |
| gcaaaaatga | ggacagccca | cactaatgat  | gtaaaacagt | taacagaggc | agtgcaaaaa | 3000 |
| atagccctgg | agagcatagt | aatatgggga  | aagattccta | aatttagact | acccatccaa | 3060 |
| aaagaaacat | gggaaacatg | gtggacagac  | tattggcaag | ccacctggat | tcctgagtgg | 3120 |
| gagtttgtta | ataccctct  | cttagtaaaa  | ttatggtagc | agctggagaa | agaaccata  | 3180 |
| gtaggagcag | aaaccttcta | tgtagatgga  | gcagccaata | gggaaactaa | attaggaaaa | 3240 |
| gcagggtata | ttactgacag | aggaaggcaa  | aaaattgtta | ctctaactga | aacaacaaat | 3300 |
| cagaagactg | aattacaagc | aatttaccta  | gctttgcaag | attcaggatc | agaagtaaac | 3360 |
| atagtaactg | actcacagta | tgcttagga   | atcattcaag | cacatccaga | taagagtga  | 3420 |
| tcagagttag | tcaaccaa   | aatagaacaa  | ttaataaaga | aggaaagggt | ctacctgtca | 3480 |
| tgggtaccag | cacataaagg | aattggaggt  | aatgaacagg | tagataaatt | agtaagcaag | 3540 |
| ggaatcagga | aagtgtgtt  | tctagatgga  | atagacaagg | ctcaagaaga | gcatgaaaaa | 3600 |
| tatcacaaca | attggagagc | aatggctagt  | gaatttaatc | taccaccagt | agtagcaaaa | 3660 |
| gaaatagtag | ctagtgtgta | taaatgtcag  | caaaaagggg | aagccacaca | tggacaagta | 3720 |
| gactgtagtc | cagggatatg | gcaattagac  | tgtagacatt | tagaaggaaa | aatcatcctg | 3780 |
| gtagcagtcc | atgtagccag | tggtacata   | gaagcagagg | ttatcccagc | agaaacagga | 3840 |
| caagaaacag | catactatat | attaaaatta  | gcaggaagat | ggccagtcaa | agtaatacat | 3900 |
| acagacaatg | gtagcaat   | taccagtgt   | gcagttaagg | cagcctgttg | gtgggcagg  | 3960 |
| atcaaaacag | aatttggaa  | tcctacaat   | ccacaaagtc | agggagtagt | agaatccatg | 4020 |
| aataaagaat | taaagaaaat | catagggcag  | gtaagagatc | aggctgagca | tcttaaaaca | 4080 |
| gcagtacaaa | tggcagtatt | cattcacaat  | tttaaaagaa | aaagggggat | tggggggtac | 4140 |
| agtgcagggg | aaagaataat | agacataata  | gcaacagaca | tacaaaccaa | agaactacaa | 4200 |
| aaacaaatta | taaacattca | aaaatttcgg  | gtttattaca | gagacagcag | agacccatt  | 4260 |

|             |             |             |             |             |            |      |
|-------------|-------------|-------------|-------------|-------------|------------|------|
| tggaaggac   | cagccaaact  | actctggaaa  | ggtgaagggg  | cagtagtaat  | acaagataat | 4320 |
| agtgcataa   | aagtgggtacc | aaggaggaaa  | gcaaaaatca  | ttagggacta  | tggaaaacag | 4380 |
| atggcaggcg  | ctgattgtgt  | ggcaggtaga  | caggatgagg  | attagaacat  | ggaatagttt | 4440 |
| agtaaagcac  | catatgtata  | tttcacggaa  | agctaattga  | tggttttaca  | gacatcatta | 4500 |
| tgaagcaga   | catccaaggg  | taagttcaga  | agtacatatc  | ccattagggg  | atgctaaatt | 4560 |
| agtaataaaa  | acatattggg  | gtttgcaaac  | aggagaaaga  | gattggcatt  | tgggtcatgg | 4620 |
| agtctccata  | gaatggagat  | tgagaagata  | tagcacacaa  | gtagaccctg  | gcctggcaga | 4680 |
| ccagctaatt  | catatgcact  | atthttgattg | ttttgcagac  | tctgccataa  | gaaaagccat | 4740 |
| attaggacac  | atagttattc  | ctaggtgtga  | ctatcaagca  | ggacataata  | aggtaggac  | 4800 |
| tctgcaatac  | ttggcactga  | cagcattgat  | aaaacccaaa  | aagagaaagc  | cacctctgcc | 4860 |
| tagtggttagg | aaattagtag  | aggatagatg  | gaacaattcc  | cagaagacca  | agggccgcag | 4920 |
| agggaaacct  | acagtgagtg  | gacactagag  | attctagagg  | aactcaagca  | ggaagctgtc | 4980 |
| agacactttc  | ctagaccatg  | gctccatagc  | ttaggacaac  | atatctatga  | aacttatggg | 5040 |
| gataacttgg  | ctggagtcga  | ggctataata  | agaatactgc  | aacaactact  | gtttattcat | 5100 |
| ttcagaattg  | ggtgccagca  | cagcagaata  | ggcatgggtc  | gacagagaag  | agcgagaaat | 5160 |
| ggagccagta  | gatcctagca  | tagagccctg  | gaaccatcca  | ggaagtcagc  | ctaaaactgc | 5220 |
| ttgtaataag  | tgttattgca  | aacgctgtag  | ctatcattgt  | ctagtttgct  | ttcagacaaa | 5280 |
| aggcttaggc  | atttcatatg  | gcaggaagaa  | gcggagacag  | cgacgcagca  | ctcctcctag | 5340 |
| cagcgaggac  | catcaagatc  | ctatatcaaa  | gcagtaagta  | tatgtaatgt  | tagatttact | 5400 |
| agcaagagta  | aattatagag  | taggagtagg  | agcattgata  | gtagcactac  | tcatagcaat | 5460 |
| agttgtgtgg  | accatagcat  | atatagaata  | taggaagctg  | ttaagacaaa  | gaaaaataga | 5520 |
| ctggttaatt  | aaaagaatta  | gggaaagagc  | agaagacagt  | ggcaatgaga  | gtgagggaga | 5580 |
| tactgaggaa  | ttggcaacga  | tgggtggacat | ggggcatctt  | aggcttttgg  | atgttaatga | 5640 |
| tttgaatgt   | gtgggggaac  | ttgtgggtca  | cagtctatta  | tgggggtacct | gtgtggaaag | 5700 |
| aagcaaaaaac | tactctatct  | tgtgcatcag  | atgctaaatc  | atatgagaaa  | gaagtgcata | 5760 |
| atgtctgggc  | tacacatgcc  | tgtgtaccca  | cagaccccaa  | cccacaagaa  | atagttttgg | 5820 |
| gaaatgtaac  | agaaaatttt  | aacatgtgga  | aaaatgacat  | ggtggatcag  | atgcatgagg | 5880 |
| atataatcag  | tttatgggat  | caaagcctaa  | agccatgtgt  | aaagttagacc | ccactctgtg | 5940 |
| tcactttaaa  | ttgtacagag  | gttaatgtta  | ccagaaatgt  | taataatagc  | gtggttaata | 6000 |
| ataccacaaa  | tgttaataat  | agcatgaatg  | gagacatgaa  | aaattgctct  | ttcaacataa | 6060 |
| ccacagaact  | aaaagataag  | aaaaagaatg  | tgtatgcact  | tttttataaa  | cttgatatag | 6120 |
| tatcacttaa  | tgagactgac  | gactctgaga  | ctggcaactc  | tagtaaataat | tatagattaa | 6180 |
| taaattgtaa  | tacctcagcc  | ctaacacaag  | cctgtccaaa  | ggtctctttt  | gacccaattc | 6240 |
| ctatacatta  | ttgtgctcca  | gctgggttatg | cgattctaaa  | gtgtaataat  | aagacattca | 6300 |
| atgggacagg  | accatgccat  | aatgtcagca  | cagtacaatg  | tacacatgga  | attaagccag | 6360 |
| tgggtatcaac | tcaactactg  | ttaaatggta  | gcctagcaga  | agaagggata  | ataattagat | 6420 |
| ctgaaaatct  | gacaaacaat  | gtcaaaaacaa | taatagtaca  | tcttaataga  | tctatagaaa | 6480 |
| ttgtgtgtgt  | aagacccaac  | aataatacaa  | gacaaagtat  | aagaatagga  | ccaggacaaa | 6540 |
| cattctatgc  | aacaggagac  | ataataggag  | acataagaca  | agcacattgt  | aacattagta | 6600 |
| ggactaactg  | gactaagact  | ttacgagagg  | taaggaacaa  | attaagagaa  | cacttcccta | 6660 |
| ataaaaaacat | aacattttaa  | ccatcctcag  | gagggggacct | agaaattaca  | acacatagct | 6720 |
| ttaattgtag  | aggagaattt  | ttctattgca  | atacatcggg  | cctgttttagt | ataaattata | 6780 |
| cagaaaataa  | tacagatggg  | acacccatca  | cactcccatg  | cagaataaga  | caaattataa | 6840 |
| atatgtggca  | ggaagtagga  | cgagcaatgt  | acgccccctc  | cattgaagga  | aacatagcat | 6900 |
| gtaaatcaga  | tatcacaggg  | ctactattgg  | ttcgggatgg  | aggaagcaca  | aatgatagca | 6960 |
| caaataataa  | cacagagata  | ttcagacctg  | caggaggaga  | tatgagggac  | aattggagga | 7020 |
| gtgaattgta  | taagtataaa  | gtggtagaaa  | ttaagccatt  | gggaatagca  | cccactgagg | 7080 |
| caaaaaggag  | agtgggtggag | agagaaaaaa  | gagcagtggg  | aataggagct  | gtgttccttg | 7140 |

```

ggttcttggg agcagcagga agcactatgg gcgcagcgtc aataacgctg acggcacagg 7200
ccagacaagt gttgtctggg atagtgcac agcaaagcaa tttgctgagg gctatagagg 7260
cgcaacagca tctgttgcaa ctcacggtct ggggcattaa gcagctccag acaagagtcc 7320
tggtataga aagataccta aaggatcaac agctcctagg actttggggc tgctctggaa 7380
aactcatctg caccactgct gtgccttgga acatcagttg gagtaataaa tctaaaacag 7440
atatttggga taacatgacc tggatgcagt gggatagaga aattagtaat tacacaaaca 7500
caatatacag gttgcttgag gactcgcaga gccagcagga gcaaaatgaa aaagatttat 7560
tagcattgga cagttggaac aatctgtgga attggtttga cataacaaaa tggctgtggg 7620
atataaaaaat atttataatg atagtaggag gcttaatagg tttgagaata atttttgctg 7680
tactctctat agtgaataga gttaggcagg gatactcacc tttgtcgttt cagaccctta 7740
tcccgaaccc aagggaaccc gacaggccag gaagaatcga agaagaaggg ggagagcaag 7800
acaaagagag atccgtgcga ttagtgagcg gattccttagc acttgcctgg gacgacctac 7860
ggagcctgtg cctcttcagc taccaccgat tgagagactt catattgggt acagcgagag 7920
cgggtggagct tctgagacgc agcagtctca agggactaca gaggggggtg gaagccctta 7980
agtatctggg aagtcttgtg cagtattggg gtctggagct aaaaagagt gctattagtc 8040
tacttgatac catagcaata gcagtagctg aaggacaga taggattata gaattaatac 8100
aaggaatttg tagagctatc cgcaacgtac ctagaagaat aagacagggc tttgaaacag 8160
ctttgctata aaatgggggg caagtgggtca aaaagcagta tagttggatg gcctgctgta 8220
agagagagaa taagaagaac tgagccagca gcagagggag taggagcagc gtctcaagac 8280
ttagataaat atggagcact tacaagcagc aacacaagta ccactaatgc tgcttgtgcc 8340
tggttgggaag cacaagagga ggaagaagtt ggctttccag tcagacctca ggtgccttta 8400
agaccaatga cttataaggc agcagtcgat ctcagcttct ttttaaaaga aaagggggga 8460
ctggaagggt taatttactc taagaaaagg caagaaatcc ttgatttgtg ggtctatcac 8520
acacaaggct tcttccctga ctggcaaaac tacacaccgg gaccaggggt cagatatcca 8580
ctgacctttg gatggtgctt caagctagtg ccagttgatc caggggaagt agaagaggcc 8640
aacgaaggag aaaacaactg tctgctacac cctatgagcc agcaaggaat ggatgatgat 8700
cacagagaag tattaaagtg gaagtttgac agtcacctag cacataaaca catggcccga 8760
gagctacatc cggagtatta caaagactgc tgacacagaa gggactttcc gctgggactt 8820
tccactgggg ttccaggagg tgtggtctgg gcgggactgg ggagtgggtca accctcagat 8880
gctgcatata agcagctgct tttcgcttgt actgggtctc tctaggtaga ccagatctga 8940
gcctgggagc tctctggcta tctaggaac ccactgctta agcctcaata aagcttgcct 9000
tgagtgtctt
9010

```

<210> 9

<211> 8972

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM751.3; 137.1632:gag; 1419.4435:pol;  
4380.4958:vif; 4898.5188:vpr; 5169.7814:tat;  
5308.7938:rev; 5407.5667:vpu; 5585.8128:env;  
8130.8753:nef

<400> 9

```

ccgaaagcga aagtaagacc agaggagatc tctcgacgca ggactcggct tgctgaagtg 60
cactcggcaa gaggcgagag cggcggctgg tgagtacgcc aattttattt gactagcggg 120
ggctagaagg agagagatgg gtgcgagagc gtcaatatta agaggcggaa aattagatga 180

```

atgggaaaga attagggttaa ggccaggggg aaaaaagcac tatatgatga aacacttaat 240  
atgggcaagc agggagctgg aaagatttgc acttaaccct ggccttttag agacatcaga 300  
aggctgtaaa caaataatac aacagctaca accagctctc cagacaggaa cagaggaaact 360  
taggtcatta tataatacag tagcaactct ctattgtgta catgaaaaga taaaggtacg 420  
agacaccaag gaagccctag acaagataga ggaagaacaa aacaaaagtc aacaaaaaat 480  
acaaaaaaca gaagcgactg gcggaaaggt cagtcaaaat tatcctatag tgcagaatct 540  
ccaagggcaa atggtacacc aggctatatc acctagaact ttgaatgcat gggtaaaagt 600  
aatagaggag aagggtttca acccagaggt aatacccatg tttacagcat tatcagaagg 660  
agccacccca caagatctaa acaccatgtt aaatacagtg gggggacatc aagcagccat 720  
gcaaatgtta aaagatacca tcaatgagga agctgcagaa tgggataggt tacatccagt 780  
acatgcaggg cctattgcac caggccaaat aagagaacca aggggaagtg acatagcagg 840  
aactactggt acccttcagg aacaaatagc atggatgaca aataaccac ctattccagt 900  
gggagacatc tataaaagat ggataattct ggggttaaat aaaatagtaa gaatgtacag 960  
ccctgtcagc attctggaca taaaacaagg accaaaggaa ccctttaggg actatgtaga 1020  
tcggttcttt aaaactttta gagctgaaca agctacacaa gatgtaaaaa ttggatgaca 1080  
gacaccttgt tggttcaaaa tgcaaccca gattgtaaga ccattttaag ggcattagga 1140  
ccaggggcta cattagaaga aatgatgaca gcatgtcagg gagtgggggg acctggccac 1200  
aaagcaagag ttttggtga agcaatgagc caagtaaaca atacaaacat aatgatgcag 1260  
aaaagcaatt ttaaaggccc taaaagaatt gttaaattgt tcaactgtgg cagggaaggg 1320  
catatagcca ggaattgcag ggctcctggg aaaaaaggct gttggaaatg tggaaaggaa 1380  
ggacaccaa tgaaagactg tactgagaga caggctaatt ttttagggaa aatttggcct 1440  
tcccagaagg ggaggccggg gaacttcctt cagaacagac cagagccaac agccccacca 1500  
gtccaacag cccaccagc agagagcttc aggttcgagg agacaacccc tgccccagg 1560  
caggagcaga aagacaagga acccttaact gccctcaaat cactctttgg cagcgacccc 1620  
ttgtctcaat aaaagtaggg ggtcagataa aggaggctct cttggataga ggagcagatg 1680  
atacagtatt agaagaaata aatttgccag gaaaatggaa accaaaaatg ataggaggaa 1740  
ttggaggttt tatcaaagta agacagtatg atcaaatact tatagaaatt tgtggaaaaa 1800  
aggctatagg tacagtatta gtaggacctt cacctgtcaa cataattggg agaaatatgt 1860  
tgaccagct tggctgcaca ctaaattttc caattagtcc tattgaaact gtaccagtaa 1920  
aattaaagc aggaatggat ggcccaaggg tcaacaatg gccattgaca gaagaaaaaa 1980  
taaaagcatt aacagcaatt tgtgaagaa tggaaaagga aggaaaaatt acaaaaattg 2040  
gccctgagaa tccatataac actccagtat ttgccataaa aaagaaggac agtactaagt 2100  
ggagaaaaat agtagatttc agggaaactca ataaaagaac tcaggacttt tgggaagttc 2160  
aattaggaat accacacca gcgggggttaa aaaagaaaaa gtcagtgaca gtactggatg 2220  
tgggggatgc gtatttttca gttccttttag atgaaggctt caggaaatat actgcattca 2280  
ccatacctag tataaacaat gaaacacctg ggattagata tcaatataat gtgcttcac 2340  
agggatggaa aggatcacca tcaatattcc agagtagcat gataaaaatc ttagagccct 2400  
ttaggacaca aaaccagaa atagttatct atcaatatat ggatgacttg tatgtaggat 2460  
ctgattttag aatagggcaa cacagagcaa aaatagagga gttaagagaa cacctattga 2520  
gatggggatt tactacacca gacaagaagc atcagaaaga gccccattt ctttgatgg 2580  
ggtatgaact ccatcctgac aaatggacag tacagcctat aaagctgcca gaaaaggaga 2640  
gctggactgt caatgatata cagaagttag tgggaaaatt aaactggcaa gtcagattta 2700  
cgcagggtt aaagtaaggc aactgtgtaa actccttagg ggagccaaag cactaacaga 2760  
catagtacca ttgactgaag aggcagaatt agaattggca gagagcaggg aaattctaaa 2820  
agaaccagta catggagtat attatgacct atcaaaagac ttaatagctg aaatacagaa 2880  
acaagggcat gaccaatgga catatcaagt ttaccaagaa ccattcaaaa atctgaaaac 2940  
aggaaagtat gcaaaaatga ggactgccca cactaatgat gtaaaacagt taacagaggc 3000  
ggtgcaaaaa atagccatgg aaagcatagt aatatgggga aagattccta aatttaggct 3060

|            |             |             |            |             |             |      |
|------------|-------------|-------------|------------|-------------|-------------|------|
| accatttcaa | aaagaaacat  | gggagacatg  | gtggacagac | tattggcaag  | ccacctggat  | 3120 |
| tcctgagtgg | gagtttggtta | atactcccc   | cctagtaaaa | ttatggtacc  | agctggagaa  | 3180 |
| agaaccata  | gcaggagcag  | aaacttacta  | tgtagatgga | gcagccaata  | gggaaactaa  | 3240 |
| aataggaaaa | gcagggtatg  | ttactgacag  | aggaaggcaa | aaaattgtta  | ctctaactga  | 3300 |
| aacaacaaat | caaaagactg  | aattacaagc  | aattcagtta | gctttgcagg  | attcaggatc  | 3360 |
| agaagtaaac | atagtaacag  | actcacagta  | tgcattagga | atcatccaag  | cacaaccaga  | 3420 |
| taagagtga  | tcagaattag  | tcaatcaaat  | aatagaacag | ttgataaaaa  | aggaaagggt  | 3480 |
| ttacctgtca | tgggtaccag  | cacacaaaag  | aattggagga | aatgaacaag  | tagataaatt  | 3540 |
| ggtaagtagt | ggaatcagga  | aagtgtctgt  | tctagatgga | atagataagg  | ctcaagaaga  | 3600 |
| gcatgaaaa  | tatcacagca  | attggagagc  | aatggctagt | gagtttaatc  | tgccacccat  | 3660 |
| agtagcaaaa | gaaatagtag  | ccagctgtga  | taaatgtcag | ctaaaagggg  | aagccataca  | 3720 |
| tggacaagta | gactgtagtc  | caggaatatg  | gcaattagat | tgtaccatt   | tagaaggaaa  | 3780 |
| agtcattctt | gtagcagtc   | atgtagccag  | tggttacata | gaagcagagg  | tcacccagc   | 3840 |
| ggaaacagga | caagaaacag  | cacttttcat  | actaaaatta | gcaggaagat  | ggccagtcaa  | 3900 |
| agtagtacat | acagacaatg  | gcagtaattt  | caccagtgtc | gcagtcaagg  | cagcctgttg  | 3960 |
| gtgggcaggt | atccaccagg  | aattttggaat | tccctacaat | cccaaagtc   | aaggagttagt | 4020 |
| agaatccatg | aataaagaat  | taaagaaaat  | tatagggcag | gtaagagatc  | aagctgagca  | 4080 |
| ccttaagaca | gcagtacaaa  | tggcagtatt  | cattcacat  | tttaaaagaa  | aaggggggat  | 4140 |
| tggggggtac | agtgcagggg  | aaagaataat  | agacataata | gcaacagaca  | tacaaactag  | 4200 |
| agaattacaa | aaacaaatta  | taaaaattca  | aaattttcgg | gtttattaca  | gagacagcag  | 4260 |
| agaccctatt | tggaaaggac  | cagccaaact  | actctggaaa | gggtgaagggg | cagtagtaat  | 4320 |
| acaagataat | agtgcataaa  | aggtaatacc  | aaggaggaaa | gcaaaaatca  | ttagggacta  | 4380 |
| tggaaaacag | atggcaggta  | ctgatagtgt  | ggcaggtaga | caggatgaag  | attagaacat  | 4440 |
| ggaatagttt | agtaaagcac  | catatgtatg  | tttcaaaaag | aactggtaga  | tggttttaca  | 4500 |
| gacatcatta | tgaaagcaga  | catccaaaaa  | taagttcaga | agtacacatc  | ccattagggg  | 4560 |
| atgccaaatt | agtaataaaa  | acatattggg  | ggctgcatcc | aggggaaaga  | gaatggcatt  | 4620 |
| tgggtcatgg | agtctccata  | gaatggagat  | tgagaagata | cagcacacaa  | gtagaccctg  | 4680 |
| gcctggcaga | ccagctaatt  | catatgcatt  | attttaattg | ttttgcagac  | tctgccataa  | 4740 |
| gaaaagccct | actaggacat  | atagttattc  | ctaggtgtga | ttatcaagca  | ggacataata  | 4800 |
| aggtaggata | cctacaatac  | ttggcactga  | cagcattgat | aaaacccaaa  | aagataaagc  | 4860 |
| cacctttacc | tagtgttagg  | aaattagtag  | aggatagatg | gaacaagccc  | cagaaaacca  | 4920 |
| agggccgcag | agggaaaccat | ataatgaatg  | ggcactagag | cttttagagg  | agctcaagca  | 4980 |
| ggaagctgtc | agacactttc  | ctagaacatg  | gctccataac | ttaggacaac  | atatctacca  | 5040 |
| aacctacggg | gatacttgga  | cgggggttga  | agctctaata | agaatactgc  | aacaactact  | 5100 |
| gtttattcat | ttcagaattg  | gatgccaaaca | tagcagaata | ggcattatgc  | gacagagaag  | 5160 |
| agcaagaaat | ggagccagta  | gatcctagac  | tagagccctg | gaatcatcca  | ggaagtcaac  | 5220 |
| ctaaaactcc | ttgtaataag  | tgttattgta  | aacactgtag | ctatcattgt  | ctagtttgct  | 5280 |
| ttcagacaaa | aggcttaggc  | atttcctatg  | gcaggaagaa | gcgagacaa   | cgacgaagcg  | 5340 |
| ctcctccaag | cagtgaggat  | catcaaaatc  | ctatatcaaa | gcagtaagta  | caaagtaata  | 5400 |
| gatgtaatgt | taaattttaga | agcaagagta  | gattatagaa | taggagtagg  | agcattaata  | 5460 |
| gcagactaa  | tcatagcaat  | agctgtgtgg  | atcatagtat | atatagaata  | tagaaaattg  | 5520 |
| tcaagacaaa | gaaaaataga  | ccggttaatt  | aaaagaatta | gagaaagggc  | agaagacagt  | 5580 |
| ggcaatgaga | gtgaagggga  | taatgaggaa  | ttggcaacaa | tgggtggatat | ggggcatctt  | 5640 |
| aggcttttgg | atgctattga  | tgtgtaatgc  | aatggggaaa | ttgtgggtca  | cagtctacta  | 5700 |
| tggggtacct | gtgtggaaaag | aagcaaaaac  | tactttatct | tgtgcatcag  | atgctaaagc  | 5760 |
| atatgagaca | gaagtgcata  | atgtttgggc  | tacacatgcc | tgtgtaccca  | cagaccccaa  | 5820 |
| cccacaagaa | atggttttgg  | aaaatgtaac  | agaaaagttt | aacatgtggg  | aaaataacat  | 5880 |
| ggtggatcag | atgcatgagg  | atataatcag  | tttatgggac | caaagcctaa  | agccatgtgt  | 5940 |

aaagttgacc ccactctgtg tcacttttaa ctgtactgct aatataacca acaatgctaa 6000  
 tataaccaac aatgctaata taaccaacta taataatgaa actgacatga gaaattgctc 6060  
 tttcaatata accacagaat taagagataa gaggaggcaa gtagatgcac tcttttataa 6120  
 acttgatata gtaccaatta atgagaattc cagtgaatat agattaataa attgtaatac 6180  
 ctcggccata acacaagcat gtccaaaggt tacttttgac ccaatcccta tacattattg 6240  
 tgtccagct ggttatgcga ttctaaagt taacaataag acattcaatg gaacaggacc 6300  
 atgcaataat gtcagcacag tacaatgtac acatggaatt aagccagtag tatcaactca 6360  
 attactgtta aatggtagtc tagcagaaga agagataata attagatcta aaaatatgac 6420  
 agacaatgcc aaaataataa tagtacatct taatgaatct gtagaaattg tgtgtacaag 6480  
 acccaacaat aatacaagga aaagtgtgag gataggacca ggacaaacat tctatgcaac 6540  
 aggagaaata ataggaaata taagacaagc atattgtaac atcagtgaag gcaaattggaa 6600  
 taacactcta caaagggtag gtgaaaaatt aagaaaatac ttccctaata aaacaataag 6660  
 ctttgacca tcctcaggag gggacctaga aattacaaca catagcttta attgtagagg 6720  
 agaatttttc tattgcaata catcaaaact gtttaattgg acgtttaatg gtacaaacac 6780  
 ttctaattgat agaagtaatt cgaccattac gcttcaatgc agaataaaac aaattacaaa 6840  
 catgtggcag ggggtaggac aagcaatgta tgctcctcca attaaaggaa acataacatg 6900  
 taaatcaaat atcacaggac tactattaac acgtgatgga gggacaaatg acacagagac 6960  
 accagagaca ttcagacctg gaggaggaga catgaaggac aattggagaa gtgaattata 7020  
 taaatataaa gtggtagaaa ttaagccatt aggagtagca cccactaagg cacgaaggag 7080  
 agtgggtggag agagaaaaaa gagcagtagg aataggagct gtgttccttg gggtcttggg 7140  
 agcagcagga agcactatgg gcgcagcatc aataacgctg acggtacagg tcagacaatt 7200  
 attgtctggt atagtgcac agcaaagcaa tttgctgagg gctatagagg cgcaacagca 7260  
 catgttgcaa ctcacagtct ggggcattaa gcagctccag gcaagagtct tggctataga 7320  
 aagataccta aaggatcaac agctcctagg gatttggggc tgctctggaa aactcatctg 7380  
 caccactgct gtgccttgga actctagtgg gagcaacaaa tctgaacggg agatttggga 7440  
 taacatgacc tggatgcagt gggatagaga aattaataat tacacagaaa caatatatag 7500  
 gttgcttgaa gtctcgcaaa accagcagga aaataatgaa agggatttac tagcattgga 7560  
 cagttgaaaa aatctgtgga attggtttaa tataacaaat tggctgtggt atataaaaaat 7620  
 attcataatg ataataggag gcttgatagg tttagaata atttttgctg tgctctctat 7680  
 agtaaataga gttaggcagg ggtactcacc tttgtcgttg cagaccctta tcccaacccc 7740  
 gagggaaacca gacaggctcg gaagaatcga agaagaagggt ggagagcaag acagagacag 7800  
 atcaattcga ttagtgaacg gattcttagc acttgtctgg gacgacctcc ggagcctgtg 7860  
 ccttttcagc taccaccgct tgagagactt catattgatt gcagcgaggg gactacagag 7920  
 ggggtgggaa actcttaagt atctggggag tcttgtagag tattgggggtc tagagctaaa 7980  
 aaagagtgtc attagtttgc ttgatactat agcaatagca gtagctgaag gaacagatag 8040  
 aattatagaa ttaacacaaa gaattttag agctatccgc aacgtacct aagaataaag 8100  
 acagggttt gaagcagctt tgcaataaga tgggaggcaa gtggtcaaaa cgagtatag 8160  
 ttggatggcc taaagtaaga gaaagaatag caagaactga tccagcagca gagggagtag 8220  
 gagcagcgtc tcaagactta gataaatatg gggcacttac aagcagtaac acaagtacca 8280  
 ataatgctga ttgtgcctgg ctggaagcgc aagaggagga gggagaagta ggctttccag 8340  
 tcagacctca ggtaccttta agaccaatga cttataagtc agcatttgat ctcagcttct 8400  
 ttttaaaaga aaagggggga ctggatgggt taatttactg taagaaaaga caagaaatcc 8460  
 tcgatttggt ggtctatcac acacaaggct acttccctga ttggcaaac tataaccgg 8520  
 gaccagggat cagatatcca ctgacctttg gatggtgcta caagctagt cagttgacc 8580  
 caagggaagt agaagaagcc aacgaaggag aggacaactg tttgctacac cctataagcc 8640  
 agcatggaat agaagatgaa gacagagaag tattaagggt gaagtttgac agttccctag 8700  
 cacgcagaca catggccgc gagctacatc cggagtatta caaagactgc tgacacagaa 8760  
 gggactttcc gctgggactt tccactgggg cgttccaggg ggtgtgatct gggcgggact 8820

```

ggggagtggc cagccctcag aagctgcata taagcagctg cttttcgcct gtactggggtc 8880
tctctaggta gaccagatct gagcccggga gctctctggc tatctaggga acccactgct 8940
taagcctcaa taaagcttgc cttgagtgc tt 8972

```

```

<210> 10
<211> 9060
<212> DNA
<213> Human immunodeficiency virus type 1

```

```

<220>
<223> isolate=94CY017.41; 159.1649:"gag";
      1442.4453:"pol"; 4398.4976:"vif"; 4916.5206:"vpr";
      5187.7841: "tat"; 5326.8046:"rev";
      5428.5673:"vpu"; 5591.8188:"env"; 8190.8843:"nef"

```

```

<400> 10
ttgaaaagcg aaagtaacag ggactcgaaa gcgaaagtgc cagaggagtt ctctcgacgc 60
aggactcggc ttgctgaggt gcacacggca agaggcgagg ggcggcgact ggtgagtacg 120
cctaataat tttttagtagc gaggctagaa ggagagagat ggggtgcgaga gcgtcaatat 180
taagcggggg aaaattagat gcttggggaga aaattcgggt aaggccaggg ggaaagaaaa 240
aatatagact gaaacatttg gtatgggcaa gcaggagagct ggagaaattc tcaattaacc 300
ctggcctttt agaaacacca gagggatgta gacaaataat aaggcagtta caaccagctc 360
tccaaacagg aacagaagaa cttaaatac tatataatac agtagtagtc ctctactggg 420
tacatcaaag ggtagatgta aaagacacca aggaagctct agataaaaata gaggaagaac 480
aaaacaagca gaaaacacag catgcagcag ctgacacagg gaacagcagc agtcaaaatt 540
atcccatagt gcaaaatgca caagggcaaa tggtagacca ggctatatca ctaggagcgt 600
tgaatgcctg ggtcaaagta gtagaagaaa aggttttcag cccagaagta atacctatgt 660
ttacagcatt atcagaagga gccacccac aagacttaaa tactatgcta aacacagtgg 720
ggggacatca agcagctatg caaatgttaa aagataccat caatgaggaa gctgcagaat 780
gggacagggg acatccagta catgcagggc ctattccacc aggccagatg agagaaccaa 840
ggggaagtga catagcagga actactagta cccttcagga acaaataggt tggatgacca 900
gcgatccacc catcccagtg ggagaaattt ataaaagatg gataatcctg ggattaaata 960
aaatagtaag aatgtatagc cctgtcagca ttttggacat aagacaaggg ccaaaagaac 1020
ccttttagaga ttatgtggat aggttcttta aaactctaag agctgagcaa gccacacagg 1080
aggtaaaaaa ctggatgacg gacaccttgc tgggtccaaa tgcaaccca gattgtagat 1140
ccatcttgag agcattagga ccaggggcct cattagaaga aatgatgaca gcatgtcagg 1200
gagtgggagg acccagccat aaagcaaggg ttttggctga agcaatgagc catgtacaaa 1260
gtacaaatac aaacataatg atgcagagag gcaatttttag ggggtcaaaa agaattaagt 1320
gtttcaactg tggcaaggaa ggacacctag ccagaaattg caggggccct aggaaaaagg 1380
gctgctggaa atgtggaaag gaaggacatc aaatgaaaga ttgactgag agacaggcta 1440
attttttagg gaaaatttgg ccttccaaca aaggagggcc aggaaatttt cctcagagca 1500
gaacagagcc aacagcccca ccagcagaga acttgagaat gggggaagag ataacctcct 1560
ccctgaagca ggaactggag accaggggaa catacaatcc tgcaatttcc ctcaaatcac 1620
tctttggcaa cgacccttg ttacagtaaa gatagaggga cagctaaaag aagctctatt 1680
agatacagga gcagatgata cagtgttaga agaaataaat ttgccaggaa aatggaaacc 1740
aaaaatgata gggggaattg gaggttttat caaagtaaga caatatgatc agatagctat 1800
agaaatttgt ggaaaaaggg ccataggtac agtattagta ggacctacc ctgtcaacat 1860
aatcgggaaga aatatgttgg ttcagcttgg ttgtacttta aattttccaa ttagtcctat 1920

```



|            |             |             |             |             |             |      |
|------------|-------------|-------------|-------------|-------------|-------------|------|
| tgaaactgta | ccagtaaaat  | taaagccagg  | aatggatggt  | ccaaaggtta  | aacaatggcc  | 1980 |
| attgacagaa | gaaaaataa   | aagcattaac  | agaaatctgt  | aaagaaatgg  | aaaaggaagg  | 2040 |
| aaaaatttca | aaaattgggc  | ctgaaaatcc  | atacaacact  | ccagtgtttg  | ctataaagaa  | 2100 |
| aaaagacagc | actaaatgga  | gaaaattagt  | agatttttaga | gaactcaata  | agagaactca  | 2160 |
| agacttctgg | gaagtccagt  | taggaatacc  | acatccagca  | ggattaaaaa  | agaaaaaagc  | 2220 |
| agtaacagta | cttgatgtgg  | gggacgcata  | tttttccggt  | cccttacatg  | aagacttcag  | 2280 |
| aaaatatact | gcattcacca  | tacctagtag  | caacaatgag  | acaccaggag  | ttaggtatca  | 2340 |
| gtacaatgta | cttcacacagg | gatggaaagg  | atcaccagca  | atattccaga  | gtagcatgac  | 2400 |
| aaagatctta | gagcccttta  | gatcaaagaa  | tacagaatta  | atcatctacc  | aatacatgga  | 2460 |
| tgacttgtat | gtaggatctg  | atttagaaat  | aagccagcat  | agagtaaaaa  | tagaggaatt  | 2520 |
| aagggtcac  | ttattgaaat  | ggggatttta  | tacaccagac  | aaaaaacatc  | agaaagaacc  | 2580 |
| tccatttctt | tggatgggat  | atgagcttca  | tcctgacaaa  | tggacagtcc  | agcctataaa  | 2640 |
| gctgccagaa | aaagacagct  | ggactgtcaa  | tgatatacag  | aaattagtag  | ggaaattaaa  | 2700 |
| ttgggcaagt | cagattttatg | cagggattaa  | agtaaagcaa  | ctgtgtaaac  | tccttagagg  | 2760 |
| agccaaagca | ctaacagaca  | tagtaacact  | gactaaagaa  | gcagagttag  | aattagaaga  | 2820 |
| gaacagggaa | attttaaaaa  | cccctgtaca  | tgggggtatac | tatgacccat  | caaaagactt  | 2880 |
| aatagcagaa | atacagaaac  | aagggcaaga  | ccaatggaca  | tatcaaattt  | atcaggaacc  | 2940 |
| ctttaagaat | ctgaaaacag  | ggaaatatgc  | aaaaaggagg  | tccaccacaca | ctaagtatat  | 3000 |
| aaaacagtta | acagaagcag  | tacaaaaaat  | aaccatggaa  | agcatagtga  | tatggggaaa  | 3060 |
| gactcctaaa | tttaaattac  | ccatacaaaa  | ggaaacatgg  | gagacatggt  | gggcggagta  | 3120 |
| ttggcaggct | acctggattc  | ctgagtggga  | gtttgtcaat  | acccctcctc  | tagtaaaact  | 3180 |
| gtggtaccag | ttagaaaaag  | aaccatagc   | aggagcagaa  | actttctatg  | tagatggggc  | 3240 |
| agctaataga | gagactaaac  | taggaaaggc  | agggtatgtc  | actgacagag  | gaagacaaaa  | 3300 |
| aattgtctcc | ctgacggaga  | caacaaatca  | aaagactgaa  | ttacatgcaa  | tctatttggc  | 3360 |
| tttacaggat | tcaggattag  | aagtgaacat  | agtgacagat  | tcacagtatg  | cattaggaat  | 3420 |
| cattcaagca | caaccagaaa  | ggagtgaatc  | agagatagtc  | aatcaaataa  | tagaaaaatt  | 3480 |
| aatagaaaag | gaaagggctc  | acctatcatg  | ggtaccagca  | cacaaaggga  | ttggaggaaa  | 3540 |
| tgaacaagta | gacaaattag  | tcagttctgg  | aatcaggaaa  | gtgctatttt  | tagatgggat  | 3600 |
| agataaggct | caagaggaac  | atgaaagata  | tcacagcaat  | tggagagcaa  | tggctcatga  | 3660 |
| ctttaatcta | ccacctgtag  | tagcaaaaaga | aatagtagct  | agctgtgata  | aatgtcagct  | 3720 |
| aaaaggggaa | gccatgcatg  | gacaagtaga  | ctgtagtcca  | ggaatatggc  | aactagattg  | 3780 |
| cacacatctt | gaaggaaaag  | ttatcctggg  | ggcagtccat  | gtggccagtg  | gctatataga  | 3840 |
| agcagaagtc | atcccaacag  | aaacaggaca  | ggatacagca  | tactttatat  | taaaactagc  | 3900 |
| aggaagatgg | ccagtaaaag  | taatacatac  | agacaatggg  | cccaatttca  | tcagtgcac   | 3960 |
| agttaaggca | gcctgttggt  | gggcagggtat | ccaacaagaa  | tttgggattc  | cctacaatcc  | 4020 |
| ccaaagtcaa | ggagttagtg  | aatctatgaa  | taaagaatta  | aagaaaatca  | tagggcagggt | 4080 |
| aagagatcaa | gctgaacacc  | ttaagacagc  | agtacaaatg  | gcagtattca  | ttcacatttt  | 4140 |
| taaaagaaaa | gggggggattg | ggggatacag  | tgcaggggaa  | agaataatag  | acataatagc  | 4200 |
| aacagatata | caaactaaag  | aactacaaag  | acaaattaca  | aaaattcaaa  | attttcgggt  | 4260 |
| ttattacagg | gacagcagag  | atccaatttg  | gaaaggacca  | gcaaaactcc  | tttggaaaagg | 4320 |
| tgaaggggca | gtagtaatac  | aagacaatag  | tgacataaag  | gtagtaccac  | gaagaaaagc  | 4380 |
| aaagatcatt | agggattatg  | gaaaacagat  | ggcagggtgat | gattgtgtgg  | caggtagaca  | 4440 |
| ggatgaggat | tagaacatgg  | aacagtttag  | ttaaacaatca | tatgtatatt  | tcaaggaaaag | 4500 |
| ctaaagggtg | ggtctataaa  | catcactatg  | aaagcagaaa  | tccaagaata  | agttcagaag  | 4560 |
| tacacatccc | gctaggggag  | gctagaataa  | tagtaagaac  | atattgggggt | ctgcacatag  | 4620 |
| gagaaaaaga | ctggcacttg  | ggcatggag   | tctccataga  | atggaggcaa  | aacagggtatc | 4680 |
| atacacaat  | agaccctgat  | ctggcagacc  | atctaatacca | tctgtattat  | tttgactgtt  | 4740 |
| tttcagaatc | tgccataagg  | aaagccataa  | taggagaaat  | agttagtcct  | aggtgtgaat  | 4800 |

atcaagcagg acataacaag gtagggctctc tgcaatatatt ggcatgaaa gcagtagtag 4860  
 cttcaacaag gacaaagcca cctttgccta gtgttaggaa attagtagag gatagatgga 4920  
 acaagcccca gaagaccaag ggccacagag ggagccatac aatgaatgga tgttagaact 4980  
 gtttagaggag ctcaagcagg aagctgttag acatttcctt aggcactggc tacatggcct 5040  
 aggacaatac atctataata cctatgggga tacctgggaa ggagttgaag ttatcataag 5100  
 atatctgcaa caactactgt ttgtccattt cagaattggg tgccaacata gcaggatagg 5160  
 cattattcga agaagaagag taagggatgg agccagtaga ccctaaacta gagccctgga 5220  
 accatccggg aagtcagcct aaaactgctt gtaccaaagt ttattgtaaa cgctgttgct 5280  
 atcattgccca gttgtgcttt ataaacaaag gcttaggcat ctctacggc aggaagaagc 5340  
 gacgaccccg acgaaagcct tctccaagca ataaggacca tcaaaatcct ataccaaaagc 5400  
 agtaagtagt agtaattaat atatgtaatg ttaccttag taatattggc aatagtagga 5460  
 ctgatagtag ctttaattctt agcaatagtt gtatggacta tagtattcat agaataaag 5520  
 aaaattaaga agcaaaggaa aatagactgg ttaatcaaaa gaataagtga gagagcagaa 5580  
 gacagtggca atgagagtga tggggacaca gaggaactat cagcacttgt ggagaggggg 5640  
 catcttgatt ttggggatgt taataatgtg taaagctaca gatttgggg tcacagtata 5700  
 ctatggagta cctgtgtgga aagatgcaga taccatccta ttttgtgcat cagatgctaa 5760  
 agcatatgat acagaagtgc ataatgtatg ggccacacat gcctgtgtac ccacagaccc 5820  
 caaccacaaa gaaataaacc tggaaaatgt aacagaaaat ttaatatgt ggaaaaataa 5880  
 catggtagag cagatgcaag aagatataat cagcttatgg gatcaaagcc taaagccatg 5940  
 tgtaaaatta acccgctct gcgtcatttt aaattgtagc aatgccata ccagcaccca 6000  
 tagcaatagc agtagcacc agagcccat taatgaagaa ataaaaact gctcttaca 6060  
 tactaccaca atactaagag ataagacaca aaaagtttat tctactgttt atagacttga 6120  
 tgtagtaciaa cttgatgaaa gtgaaaataa gaatacatca ggtagtaata ctctgtatag 6180  
 actaataaat tgtaatacct caaccatcac acaagcgtgt ccaaaggtaa cctttgagcc 6240  
 aattcctata cattattgtg cccagctgg ttttgcgatt ctaaagtgt aggatccgag 6300  
 attcaatgga acagggtcat gcaagaatgt tagctcagta caatgtacac atggaattaa 6360  
 accagtagca tcaactcaac tgctgttgaa tggcagtcta gcagaaggag ggaaaataat 6420  
 gattagatct gaaaatatta caaacaatgc caaaaacata atagttcagt ttactaagcc 6480  
 tgtactaatt acttgatca gacccaacaa caatacaaga aaaagtatac gctttggacc 6540  
 aggacaagcc ttctatacaa atgaaataat aggggacata agacaagcac attgtaatat 6600  
 caacaaaaca ttatggaatg acactttaca aaaggtagct gaacaattaa gagagaaatt 6660  
 ccctaagaaa accataatct ttactaactc ctccaggagg gaccagaaa ttacaacact 6720  
 tagttttaat tgtgcaggag aatttttcta ttgcaataca acaggcctgt ttaatggtac 6780  
 gtggtggaac aatggtacgt ggaacgggccc ctacacacct aataacacca atggaagtat 6840  
 aatcctccca tgcagaataa aacaaattat aaacatgtgg cagagagtag gaagagcaat 6900  
 gtatgccct cccattgcag gaataataaa gtgtacatca aacattacag gaataatatt 6960  
 gacaagagat ggtggttaaca atgggactaa tgagaccttc agacctggag gaggagatat 7020  
 gagggacaat tggagaagtg aattatataa atataaagta gtaaaacttg aaccactagg 7080  
 agtagcacct accagggcaa aaagaagagt ggtggagaga gaaaaaagag cagttggact 7140  
 gggagctgtc ttccttgggt tcttgggagc agcaggaagc actatgggcg cggcgtcact 7200  
 aacgctgacg gtacaggcca gacaattatt gtctggtata gtgcaacagc aaagcaattt 7260  
 gctgcaggct atagaagctc aacagcatct gttgaaactc acagtctggg gcattaaaca 7320  
 gctccaggcg agggctctgg ctgtggaaag atacctaaag gatcaacagc tcctgggaat 7380  
 ttggggctgc tctggaaaac tcatctgcgc cactactgtg ccctggaaca ctagtggag 7440  
 taataagtct caggatgaga tttgggacaa catgacctgg ttgcaatggg ataaagaaat 7500  
 tagcaattac acaaacataa tatatagggt acttgaagaa tcgcaaaacc agcaggaaaa 7560  
 gaatgagcaa gacttattgg cattagacaa atgggcagat ttgtggagt ggttcaacat 7620  
 ttcacactgg ctgtggtata taagaatatt tataatgata gtaggaggct tgataggatt 7680

```

aagaatagtt tttgctataa ttactgtagt aaatagagtt aggcagggat actcacctgt 7740
gtcatttcag atccctaccc caagcccaga ggggtcccgac aggccagag gaaccgaaga 7800
aggaggtgga gagcaaggca gagacagatc gattcgatta gtgaacgggt tcttcgcact 7860
tgcctgggac gacctacgga gcctgtgcct cttcagttac caccgcttga gagattgcat 7920
attgattgca gcgaggactg tggaaacttct gggacactgc agtctcaagg gactgagact 7980
ggggtgggaa ggtctcaaga atctgtggaa tcttctgtta tactggggtc gggaactgaa 8040
gaatagtgtc attagcttat ttgatactat agcagtagca gtagctgagt ggacagatag 8100
ggttatagaa atagggcaaa gagctttcag agctattctc aacataccta gaagaatcag 8160
acagggctta gaaagggctt tactataaaa tggggggcaa gtggtcaaaa aggagcatac 8220
caggatggcc tgctattagg gagagaatga gaagaactcc tccaacagca caaagaacag 8280
aagcagtgtc tccagcagca ccaggagtag gagcagtgtc tcaagattta gctactcatg 8340
gagcagtcac aagcagtaat acagcagcta ctaatcctga ttgcgcctgg gtggaagcgc 8400
aagaagagga gagtgaagta ggcttccag tcaggccaca ggtaccttta aggccaatga 8460
ccttcaaggg agcgtttgat ctcagcttct ttttaaaaga aaagggggga ctggatgggt 8520
taatttactc ccagaaaaga caagacatcc ttgatattgt ggtctaccac acacaaggct 8580
acttccctga ttggcagaat tacacaccag ggccagggat cagataccca ttaacatttg 8640
gatggtgctt caagctagta ccagtagagc catctgaggt agaagaagct actcagggag 8700
agaacaacag cttattacac cctatatgcc aacatggagt agatgaccct gaaagagaag 8760
tgttaagatg ggagtttgat agaagcctgg cacggagaca cagagcccga gagctgcatc 8820
cggagtacta caaagactgc tgacacagaa gttgctgacg gggactttcc gctggggact 8880
ttccagggag gtgtggtgtg ggcggagttg gggagtggct aaccctcaga tgctgcatat 8940
aagcagctgc ttctcgcatg tactgggtct ctcttggtgg accagataga gcccgggagc 9000
tctctggcta gcaggggaac ccactgctta agcctcaata aagcttgctt tgagagcttc 9060

```

<210> 11

<211> 8959

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

```

<223> isolate=94IN476.104; 138.1613:"gag";
      1418.4428:"pol"; 4361.4939:"vif"; 4879.5169:"vpr";
      5150.7782:tat"; 5289.7939:"rev"; 5378.5638:"vpu";
      5556.8129:"env"; 8131.8754:nef

```

<400> 11

```

ttgaaagcga aagtaagacc agaggagatc tctcgacgca ggactcggct tgctgaagtg 60
cactcagcaa gaggcgaggg gggcgactgg tgagtacgcc aatttttatt tgactagcgg 120
aggctagaag gagagagatg ggtgcgagag cgtcaatatt aagaggggga aaattagata 180
gatgggaaaa aattcgggta aggccagggg gaaagaaaca ttatatgata aaacacttag 240
tatgggcaag cagggagctg gaaagatttg cgcttaaccc tggcctttta gagacgtcag 300
acggatgtaa acaaataata aaacagctac atccagctct taagacagga acagaggaac 360
ttaggtcatt attcaacaca gtagcaactc tctattgtgt acatgcaggg atagaggtac 420
gagacaccaa ggaagcctta gacaagatag aggaagaaca aaacaaaagt cagcaaaaaa 480
tacagcaggc aaaagaggct gacggaaagg tcagtcaaaa ttatcctata gtgcaaaatc 540
tccaagggca aatggtacac cagcccctat cacctagaac tttgaatgcg tgggtaaaag 600
taatagagga gaaggctttt agcccagagg taatacccat gttcacagca ttatcagaag 660
gagccacccc ctctgattta aacaccatgt taaatacagt ggggggacat caagcagcca 720

```

|             |             |            |            |             |             |      |
|-------------|-------------|------------|------------|-------------|-------------|------|
| tgcaaatgtt  | aaaagatacc  | atcaacgagg | aggctgcgga | atgggataga  | ttacatccag  | 780  |
| tacatgcagg  | gcctaatacca | ccaggccaga | tgagagaacc | aaggggaagt  | gatatagcag  | 840  |
| gaactactag  | tacccttcag  | gaacaaatag | catggatgac | aggtaacca   | cctattccag  | 900  |
| tgggagacat  | ctataaaaga  | tggataattc | tgggggttaa | taaaatagta  | agaatgtata  | 960  |
| gccctgtcag  | catttttgac  | ataagacaag | ggccaaagga | accctttaga  | gactatgtag  | 1020 |
| accggttctt  | taaaacttta  | agagctgaac | aagctacaca | agaagtaaaa  | ggttggatga  | 1080 |
| cagacacctt  | gttggtccaa  | aatgcaaacc | cagattgtta | gaccatttta  | agagcattag  | 1140 |
| gaccaggggc  | ttcattagaa  | gaaatggtga | cagcatgtca | aggagtggga  | ggacctagcc  | 1200 |
| acaaagcaag  | agtgttggct  | gaggcaatga | gccaatcaca | tagtaacata  | atgatgcaga  | 1260 |
| gaggcaattt  | taaaggccct  | aaaagaattg | ttaaatgctt | caactgtggc  | aaggaagggc  | 1320 |
| acatagccag  | aaattgcagg  | gcccctagaa | aaagaggctg | ttggaaatgt  | gggcaagaag  | 1380 |
| gacaccaa    | gaaagactgt  | actgagaggc | aggctaattt | tttagggaaa  | atttggcctt  | 1440 |
| cccacaaggg  | gaggccaggg  | aatttccttc | aaaacaggcc | agagccaaca  | gccccaccag  | 1500 |
| cagagagcct  | caggttcaag  | gagacaaccc | ccgctccgaa | gcaggagtcg  | aaagacaggg  | 1560 |
| aacccttaac  | ttccctcaaa  | tcactctttg | gcagcgaccc | cttgtctcaa  | taaaagtagg  | 1620 |
| gggccagata  | aaggaagctc  | tcttagacac | aggagcagat | gatacagtat  | tagaagaaat  | 1680 |
| agctttgcc   | ggaagatgga  | aacccaaaat | gataggagga | attggagggt  | ttatcaaagt  | 1740 |
| aagacagtat  | gatcaaat    | ttatagaaat | ttgtggaaaa | aaggctatag  | gtacagtatt  | 1800 |
| agtaggacct  | acacctgtca  | acataattgg | aagagatatg | ttgactcagc  | ttggatgcac  | 1860 |
| tctaaatttt  | ccaattagcc  | ccattgaaac | tgtaccagta | aaattaaagc  | caggaatgga  | 1920 |
| tggcccaaag  | gttaaacagt  | ggccattgac | agaagagaaa | ataaaagcat  | taacagaaat  | 1980 |
| ttgtaaagaa  | atggagaagg  | aaggaaaaat | tacaaaaatt | gggcctgaaa  | atccatataa  | 2040 |
| cactccagta  | tttgccataa  | aaaggaagga | cagtactaag | tggagaaaat  | tagtagat    | 2100 |
| cagggaagctc | aataaaagaa  | ctcaagactt | ttgggaagtt | caattaggaa  | taccacaccc  | 2160 |
| agcaggttta  | aaaaagaaaa  | aatcagtgac | agtactggat | gtgggggatg  | catatttttc  | 2220 |
| agttccttta  | gatgaaggct  | tcgggaaata | tactgcattc | accataccta  | gtataaaca   | 2280 |
| tgaacacca   | gggattagat  | atcaatataa | tgtgcttcca | cagggatgga  | aaggatcacc  | 2340 |
| agcaatattc  | cagagtagca  | tgacaaaaat | cttagagccc | tttagggcac  | gaaatccaaa  | 2400 |
| aatagtcac   | tatcaatata  | tggatgactt | gtatgtaggg | tctgacttag  | aaatagggca  | 2460 |
| tcatagagca  | aaaatagagg  | agttaagagc | acatctatta | aagtggggat  | tcaccacacc  | 2520 |
| agataagaaa  | catcagaaag  | aacccccatt | tctttggatg | gggtatgaac  | tccatcctga  | 2580 |
| caaatggaca  | gtacagccta  | taaagctgcc | agaaaaggat | agctggactg  | tcaatgat    | 2640 |
| acagaagtta  | gtgggaaaaat | taaactgggc | aagtcagatt | taccagggga  | ttaaagtga   | 2700 |
| gcaactttgt  | aaactcctta  | ggggggccaa | agcactaaca | gacatagtac  | cactaactga  | 2760 |
| agaagcagaa  | ttagaattag  | cagagaacag | ggaaattcta | aaagagccag  | tacatggagt  | 2820 |
| atattatgac  | ccatcaaaag  | acttaatagc | tgaaatacag | aaacaggggc  | atgaccaatg  | 2880 |
| gacatatcaa  | atttaccag   | aaccattcaa | aaatctgaaa | acaggggaagt | atgcaaaaat  | 2940 |
| gaggactgct  | cacactaatg  | atgtaaaaca | gttaacagag | gcagtgcaaa  | aaatagccat  | 3000 |
| agaaagcata  | gtaatatggg  | aaagaccctt | aaatttagac | taccatcca   | aaaagaaacg  | 3060 |
| tgggagacat  | ggtggacaga  | ctattggcag | gccacctgga | ttcctgattg  | ggagtttggt  | 3120 |
| aatacccttc  | ccctagtaaa  | attatggtac | cagctagaaa | agaacccat   | agtaggagca  | 3180 |
| gaaactttct  | atgtagatgg  | agcagcta   | agggaaacta | aagtaggaaa  | agcaggggat  | 3240 |
| gttactgaca  | gaggaaggca  | gaaaattgtt | tctttaactg | aaacaacaaa  | tcagaagact  | 3300 |
| gaattgcaag  | caattcagct  | agctttgcaa | gattcaggaa | cagaagtaaa  | catagtaaca  | 3360 |
| gactcacagt  | atgcattagg  | aatcattcaa | gcacaaccag | ataaaagtga  | atcagagtta  | 3420 |
| gtcaaccaa   | taatagaaca  | attaataaac | aaagaaagag | tctatctgtc  | atgggtacca  | 3480 |
| gcacataaag  | gaattggagg  | gaatgaacaa | gtagatagat | tagtaagtag  | tgggaattagg | 3540 |
| aaagtactgt  | ttctagatgg  | gatagataag | gctcaagaag | atcatgaaa   | gtatcacagc  | 3600 |

aattggagag caatggctaa tgagtttaat ctgccacca tagtagcaaa agaaatagta 3660  
gctagctgtg ataaatgcca gctaaaaggg gaagccatgc atggacaagt agaccgtagc 3720  
ccagggatat ggcaattaga ttgtacacat ctagaaggaa aaatcatcct ggtagcagtc 3780  
catgtagcca gtggctacat agaagcagag gttatcccag cagaaacagg acaagaaaca 3840  
gcatactata tactaaaatt agcaggaaga tggccagtca aagtaatata tacagacaat 3900  
ggtagtaatt tcaccagtgc tgcagttaag gcagcctgtt ggtgggcagg tatccaacag 3960  
gaatttgga ttcctacaa tccccaaagc cagggagtag tagaatccat gaataaagaa 4020  
ttaaagaaaa ttatagggca ggtaagagaa caagctgagc accttaagac agcagtacaa 4080  
atggcagtat tcattcaciaa ttttaaaaga aaagggggga ttggggggta cagtgcaggg 4140  
gaaagaacaa tagacataat agcaacagac atacaaacta aagaattaca aaaccaaat 4200  
acaaaaattc aaaattttcg ggtttattac agagacagca gagaccccat ttggaaagga 4260  
ccagccaaac tgctctggaa aggtgaaggg gcagtagtaa tacaagataa tagtgacata 4320  
aaggtagtgc caaggaggaa agcaaaaatt attagggatt atggaaaaca gatggcagg 4380  
gctgattgtg tggcaggtag acaggatgag gatcagaaca tggaaatagt tagtaaaaca 4440  
ccatatgtat gtttcaagaa gagctagtgg atggttttac agacatcatt atgaaagcag 4500  
acatccaaaa gtaagtgcag aagtacacat cccattagga gatgctagat tagtaataaa 4560  
aacatattgg ggtttacaaa caggagaaag agattggcat ttgggtcatg gcgtctccat 4620  
agaatggaga ttgggaagat atagcacaca agtagaacct ggctggcag accagctaata 4680  
ccatatgcat tattttgatt gttttgcaga ctctgccata agaaaagcca tattaggaca 4740  
catagttatt tctaggtgtg attatcaagc aggacataat aaggtaggat ctctacaata 4800  
cttggcactg acagcattga taaaaccaa aaagagaaag ccacctctgc ctagtgttaa 4860  
gaaattagta gaggatagat ggaacaatcc ccagaagacc agggaccaca gagggaaacca 4920  
tacaatgaat ggacactaga gcttctagag gaactcaagc aggaagctgt cagacacttt 4980  
cctagacctt agcttcatag cttaggacaa tatatctatg aaacatatgg ggatgcttgg 5040  
acaggagtgc aagctttaat aagaacactg caacaattac tgtttattca tttcagaatt 5100  
gggtgccagc atagcagaat aggcatttta caacggagaa gagcaagaaa tggagccagt 5160  
agatcctaac ctagagccct ggaaccatcc aggaagtcag cctaaaactg cttgtaatac 5220  
atgctattgt aaacactgta gctaccattg tctagtttgc tttcagacaa aaggcttagg 5280  
catttcctat ggcaggaaga agcggagaca gcgacgcagc gctcctccaa gcagttagga 5340  
tcatcaaaat cttatatcaa agcagtaagt atatgtaatg gtgaatttat tagaaagagt 5400  
agattataga ttaggagtag gagcattaat agtagcatta atcttagcaa taattgtgtg 5460  
gaccatagca tatctagaat ataggaaatt gttaagacaa agaaaaataa acaggttaat 5520  
tgaaagaatt agggaaagag tagaagacag tggcaatgag agtgaggggg atactgagga 5580  
attgtcaaca ctgggtgata tggggaatct taggcttttg gatgctaata atttataatg 5640  
tagtagggaa cttgtgggtc acagtctatt atggggtacc tgtgtggaaa gaagcaaaaa 5700  
ctactttatt ctgtgcatca gatgctaaag cttatgagaa ggaggtgcat aatatctggg 5760  
ctacacatgc ctgtgtacc acagacccca acccacaaga gatggattta gtaaatgtaa 5820  
cagaaaattt taacatgtgg aaaaatgaca tgggtggatca gatgcatgag gatgtaata 5880  
gtttatggga tcaaagccta aagccatgtg taaagttgac cccactctgt gtcactttta 5940  
actgtagtaa ggttaccaat aatgctactt acaataatac tgatgatata aaaaattgct 6000  
cttttaatgc aaccacagaa ataagagaca agaaacgcaa agagtatgca ctgttttata 6060  
gactcgatat agtaccacta aatgagaata agaacagctc tagtaactat agtgagtaca 6120  
tattaataaa ttgtaatacc tcaaccataa cacaagcctg tccaaaggtc tcttttgacc 6180  
caattcctat acattattgt gctccagctg gttttgcgat tctaaagtgt aaagatgaga 6240  
cattcaatgg gacaggacca tgcaaggagg tcagtacagt acaatgtaca catggaatta 6300  
agccagtgg atcaactcaa ctactgttaa atggtagcac agcagaaaaa gagataataa 6360  
ctagatctga aaatataaca gacaatgcaa aaactataat agtacatctt aatgaatcca 6420  
taaaaattgt atgtacaaga cccaacaata acacaagaaa aagtataagg atagggccag 6480

|            |            |             |            |             |             |      |
|------------|------------|-------------|------------|-------------|-------------|------|
| gacaagcatt | ctatgcaaca | aacggcataa  | taggagacat | aagacaagca  | cattgtaaca  | 6540 |
| ttagtgaatc | taactggact | aaaactttac  | aagaggtagg | aaaaaaatta  | gcaaagcact  | 6600 |
| tcctaataa  | aacaataagt | ttcaaccaat  | cctcaggagg | ggacctagaa  | attgtaacac  | 6660 |
| atagctttta | ttgtggagga | gaattctttt  | attgtaatac | atcaagactg  | tttaacggta  | 6720 |
| catacaatgg | tacagacatg | cctacataca  | atggtacaaa | ttccagttca  | gacatcatca  | 6780 |
| tgcttccatg | cagaataagg | caatttataa  | acatttggca | gaaggtagga  | cgagcaatgt  | 6840 |
| atgccccctc | cattgaagga | aacataacat  | gtgaatcaaa | tatcacagga  | ctactattag  | 6900 |
| tacgtgatgg | aggcgacaca | aatagtagca  | cagagatatt | cagacctgga  | ggaggagata  | 6960 |
| tgagggacaa | ttggagaagt | gaattatata  | aatataaagt | ggtagaaatt  | aagccattag  | 7020 |
| gaatagcacc | tactgaagca | aaaagggagag | tggtggagag | agaaaaaaga  | gcagtgggaa  | 7080 |
| taggagctgt | gttccttggg | ttcttgggag  | tagcaggaag | cactatgggc  | gcggcgta    | 7140 |
| tgacgctgac | ggtagaggcc | agacaattgt  | tgtctggtat | agtgcacag   | caaagcaatt  | 7200 |
| tgctgaaggc | tatagaggcg | caacagcata  | tggtgcaact | cacagtctgg  | ggcattaagc  | 7260 |
| agctccagac | aagagtcttg | gctatagaga  | gatacctaaa | ggatcaacag  | ctcctaggga  | 7320 |
| tttggggctg | ctctggaaaa | gtcatctgcc  | ccactgctgt | gccttggaac  | tccagctgga  | 7380 |
| gtaataaatc | aaaagatgat | atttgaata   | acatgacctg | gatgcagtgg  | gataaagaga  | 7440 |
| ttagtaatta | cacaaacaca | atataccggt  | tgcttgaaga | atcgcaaatc  | cagcaggaa   | 7500 |
| aaaatggaaa | agatttatta | gcattggaca  | gttggcaaaa | tctgtggaat  | tggttttagca | 7560 |
| taacaaaatg | gctgtggtat | ataaaaatat  | tcataattat | agtaggaggc  | ttgatagggt  | 7620 |
| tgagaataat | ttttgctgtg | ctatctatag  | taaatagagt | taggcaggga  | tactcacctt  | 7680 |
| tgctggttgc | gacccttacc | ccagaccgca  | gggaaccgca | caggctcaga  | ggaatcgaag  | 7740 |
| aagaaggtgg | agagcaagac | aaagacagat  | ccattcgatt | agtgaacgga  | ttcttagcac  | 7800 |
| ttgcctggga | cgatctacgg | agcctgtgcc  | tcttcagttg | ccaccgattg  | agagacttca  | 7860 |
| tattggttgc | agcgagagcg | gtggaacttc  | tgggacgcag | cagtctcagg  | ggactacaga  | 7920 |
| gggggtggga | agcccttaaa | tatctgggaa  | gtcttgtgca | gtattggggt  | ctggaactaa  | 7980 |
| aaaagagtgc | tattagtctg | cttgatacca  | tagcaataac | aatagctgag  | ggaacagata  | 8040 |
| ggattataga | atttacacaa | agaatttgca  | gagctatccg | caacatacct  | agaagaataa  | 8100 |
| gacagggttt | tgaagcagct | ttgctataaa  | atggggagca | agatgtcaaa  | aagcagaata  | 8160 |
| gttggatggc | ctgaggtaag | agaaagaatg  | aggagaactg | agccagcagc  | agagggagta  | 8220 |
| ggagcagcat | ctcaagactt | agctaaacat  | ggagcactta | caaccagcaa  | cacaccaagc  | 8280 |
| aataatgctg | ctgggtgctg | gctgcaagcg  | caagaggagg | aagaagaagt  | aggctttcca  | 8340 |
| gtcagacctc | aggtgccttt | aagaccaatg  | acttataaag | gagcattcga  | tctcgcttcc  | 8400 |
| tttttaaaag | aaaagggggg | actggatggg  | ttaatttact | ctaagaaaag  | gcatgaaatc  | 8460 |
| cttgatttat | gggtttataa | cacacaaggc  | tacttccctg | attggcaaaa  | ctacacacca  | 8520 |
| ggaccagggg | tcagatatcc | actgaccttt  | ggatggtgct | acaagctagt  | accagttgac  | 8580 |
| ccaagtgtag | tagaagaggc | caacaaagga  | gaaaacaact | gttttgctaca | ccctatgagc  | 8640 |
| caacatggaa | tgatgatga  | agatggagaa  | gtattaaagt | ggcagtttga  | cagcagccta  | 8700 |
| gcacgcagac | acatagcccc | cgagctacat  | cggaggtatt | acaaagactg  | ctgacacaga  | 8760 |
| agggactttc | cactggggcg | ttccagggga  | gtggtctggg | cgggacatgg  | gagtgggtcaa | 8820 |
| ccctcagatg | ctgcatataa | gcagctgctt  | ttcgctgtga | ctgggtctct  | ctaggtggac  | 8880 |
| cagatctgag | cccgggagct | ctctggctac  | ctagtgaacc | cactgcttaa  | gcctcaataa  | 8940 |
| agcttgcctt | gagtgtctt  |             |            |             |             | 8959 |

<210> 12

<211> 1479

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR020; gene=gag

<400> 12

```
atgggtgcga gagcgtcagt attaagcggg ggaaaattag atgcttggga aaaaattcgg 60
ttaaggccgg ggggaaagaa aaaatataga ctaaaacatc tagtatgggc aagcagggag 120
ctagaacgat ttgcacttga tccaggcctt ctagaacatc cagaaggctg tcgaaaaata 180
ataggacagt tacaaccatc ccttcagaca ggatcagaag agctcaaadc attatataat 240
acaatagcag tcctctatta tgtacatcaa aaggtagagg taaaagacac caaggaggct 300
ttagagaagc tagaggaaga acaaaacaaa ggtcggcaaa agacacagca agcgactgct 360
gaaaaagggg tcagtcaaaa ttacctata gtacagaatc ttcagggaca aatggtacac 420
cagtctttat cacctagaac tttaaattgca tgggttaaagg tgatagaaga gaaggctttt 480
agtccagaag taatacccat gttttcagca ttatcagaag gggccactcc acaagattta 540
aacaccatgt taaatacagt ggggggacat caagcagcca tgcaaattgt aaaagacacc 600
atcaatgagg aggctgcaga atgggacaga ttacatcaa cacaggcagg acccatcccc 660
ccaggtcaga taagggaacc taggggaagt gatatagctg gaactactag tacccttcag 720
gaacaaatac aatggatgac aggcaaccca cctgtcccag tgggagaaat gtataaaaga 780
tggatcatcc taggattaaa taaaatagta agaattgata gccctgtcgg cattttggac 840
ataagacaag ggccaaaaga accctttaga gactatgtag acaggttctt taaaacccta 900
agagctgagc aagctacaca ggaagtaaag ggttgatga cagacacctt gttggtccaa 960
aatgcgaacc cagattgtaa gaccatttta aaagcattgg gaccaggggc tacactagag 1020
gaaatgatga cagcatgtca gggagtggga ggacctagcc ataaggcaag agttttggct 1080
gaggcaatga gccaaagcaac aaatacagct ataatgatgc agaaaagtaa ctttaagggc 1140
caaagaagaa ttgttaaattg ctttaattgt ggcaagaag gacacatagc caaaaattgc 1200
agggcccta gaaaaaaggg ctgttggaag tgtggaagag agggacacca aatgaaggac 1260
tgactgaga gacaggctaa ttttttaggg aaaatttggc cttccaacaa ggggagggcc 1320
ggaaacttca tccagaacag gccagagccg tcagccccgc cagcagagag cttcagggtc 1380
ggggaggaga caaccccatc tccgaagcag gagcagaaag acgagggact gtaccctccc 1440
ttagcttccc tcaaatcact ctttggaac gaccctag 1479
```

<210> 13

<211> 579

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR020; gene=vif

<400> 13

```
atggaaaaca gatggcaggat gatgattgtg tggcaggtag acaggatgag gattaacaca 60
tggaaaagtt tagtaaaata ccatatgcat atttcaaaga aagccaaagg atggttttat 120
agacatcact ttgaaagcag gcatccaaaa ataagttcag aagtacacat cccactagag 180
acagctgaat tagtaataac aacatactgg gggctgcttc caggagaaaag agaattggcat 240
ctgggtcagg gagtctccat agaattggagg caggggagggt atagaacaca aatagaccct 300
ggcctggcag accaactgat ccatatatat tattttgatt gtttttcaga atctgccata 360
aggaaagcca tattaggaca taaaattagc cctaggtgta actatcaagc aggacataac 420
aaggtaggat ctctacaata cttggcacta acagcattaa tagctccaaa aaagacaaag 480
ccgcctttgc ctagtgtcca gaaactagta gaagacagat ggaacaagcc ccagaagacc 540
```

agggggccaca gagagagcca tacaatgaat ggacactag

579

<210> 14

<211> 291

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR020; gene=vpr

<400> 14

```
atggaacaag cccagaaga ccaggggcca cagagagagc catacaatga atggacacta 60
gatcttttag aggagcttaa gaatgaagct gttagacatt ttcctaggcc atggctccat 120
agcttaggac aacatatcta taacacctat ggggatactt gggaaggagt tgaagcaatc 180
ataaggatat tgcaacaact actgtttatc catttcagaa ttgggtgccg tcatagcaga 240
ataggcatta ctcgacagag aagagtaaga aatggaacta gtagatccta a          291
```

<210> 15

<211> 2610

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR020; gene=tat

<400> 15

```
atggaactag tagatcctaa cttagatccc tggaaccatc caggaagcca gcctacaact 60
ccttgtacca gatgttattg taaatgggtg tgctttcatt gttactgggtg ctttacaacg 120
aagggccttag gcatctccta tggcaggaag aagcggagac agcgaccaag aactcctcaa 180
agcagtcaga tacatcaaga ttttgtacca aagcagtaag tattgttaag catatgtaat 240
gtcaaatttg ttagcaatag gcatagcagc attaatagta gcactaataa taacaatagt 300
tgtgtggact atagcatata tagaatataa gaaactggta aggcaaagaa aaataaatag 360
gttatataaa agaataagcg aaagagcaga agacagtggc aatgagagtg agggggatgc 420
agaggaattg gcagcacttg ggggaagtggg gcctttttatt cctggggaca ttaataatct 480
gtaatgctgc agaaaactta tgggttacag tctattatgg ggtacctgtg tggaaagaag 540
caaccactac tctattctgt gcatcagatg ctaaatacata tgaaaaagag gcacataatg 600
tctgggctac acatgcttgt gtaccacag atcccaatcc acaagaagta gttctggaaa 660
atgtaacaga aaggtttaat atgtgggaaa ataacatggg agaacaaatg catacagata 720
taatcagttt atgggatcaa agcctaaagc catgtgtgaa gtttaaccca ctctgtgtta 780
cttttagattg tagaaacatt gccaccaatg gcaccaatga cactattgcc atcaatgaca 840
ctctgaagga agatccagag gcaatacaaa actgttcttt caatacaacc acagaaataa 900
gagataagca gctgaaagta catgcacttt tttataaact tgatatagta caaatcaaca 960
aggatgacaa tagaacatac agactaataa attgtgatgc ctcaaccatt acacaggctt 1020
gtccaaaggt atcttgggat ccaattccca tacattattg tgctccagct gggtatgcga 1080
ttctaaagtg taatgagaaa aatttcacag ggacagggtc atgcaagaat gtcagtacag 1140
tacaatgtac acatggaatt aaaccagtgg tatccactca attgttggtta aatggcagcc 1200
tagcagaagg agagatagta atcagatctc aaaatatctc agataatgca aaaaccataa 1260
tagtgcacct taatgaatct gtacagatta attgtacaag acccaacaac aatacaagaa 1320
```



|            |            |             |             |             |            |      |
|------------|------------|-------------|-------------|-------------|------------|------|
| aaagaatatc | tttaggacca | ggacgagtat  | tttataacaac | aggagaaata  | ataggagaca | 1380 |
| tcagaaaggc | acattgtaac | gttagtggaa  | cacaatggag  | gaacacgtta  | gcaaaggtaa | 1440 |
| aggcaaagtt | agggtcttat | ttccctaattg | caacaataaaa | atttaactca  | tcctcaggag | 1500 |
| gggacctaga | aattacaagg | cataatttta  | attgtatggg  | agaatttttc  | tactgtataa | 1560 |
| cagatgaact | gtttaatgac | acaaaattca  | atgacacagg  | attcaatggc  | actatcactc | 1620 |
| tcccatgtcg | aataaaacaa | attgtaaaca  | tgtggcagga  | agtggggacga | gcaatgtatg | 1680 |
| ccaatcccat | tgcaggaaac | attacctgta  | actcaaatat  | tacaggctctg | ctattgacaa | 1740 |
| gagatggtgg | tctgaatagt | actaatgaga  | ccttcagacc  | tgggggagga  | aatatgaaag | 1800 |
| acaattggag | aagtgaatta | tataaatata  | aagtagtaga  | aattgaacca  | ctaggagtag | 1860 |
| cacccacca  | ggcaaaaaga | caagtgggtga | agagagaaag  | aagagcagtg  | ggactaggag | 1920 |
| ctctgttcct | tgggttcttg | ggagcagctg  | gaagcactat  | gggcgcggcg  | tcaataacgc | 1980 |
| tgacggtaca | ggccagacaa | ttattgtctg  | gaatagtgca  | acagcagagc  | aatctgctga | 2040 |
| gggctattga | agcgaacag  | catctgttgc  | agctcacagt  | ctggggcatt  | aaacagctcc | 2100 |
| aggcaagagt | cctggctgtg | gaaagatacc  | taaaggatca  | acagctccta  | gggctttggg | 2160 |
| gctgctctgg | aaaactcatc | tgcaccacta  | atgtgccctg  | gaactctagt  | tggagtaata | 2220 |
| aatctcttga | ggagatttgg | gggaacatga  | cctggatgga  | gtgggaaaaa  | gaggttagca | 2280 |
| attactcaaa | agaaatatac | aggtttaattg | aagactcgca  | gaaccagcag  | gaaaagaatg | 2340 |
| aacaagaatt | attagcattg | gacaaatggg  | caagtctgtg  | gaattggttt  | gacataacac | 2400 |
| agtggctgtg | gtatataaaa | atattcataa  | tgatagtagg  | aggcttgata  | ggcttaagaa | 2460 |
| tagtttttac | tgtgctttct | atagtaaata  | gagttaggaa  | gggataactca | cctttgtcat | 2520 |
| ttcagacca  | tatcccaagc | ccgagggaac  | ccgacaggcc  | cgaaggaatc  | gaagaaggag | 2580 |
| gtggagagca | aggcaaagac | agatccgtga  |             |             |            | 2610 |

<210> 16

<211> 2661

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR020; gene=rev

<400> 16

|            |            |            |            |             |            |     |
|------------|------------|------------|------------|-------------|------------|-----|
| atggcaggaa | gaagcggaga | cagcgacca  | gaactcctca | aagcagtcag  | atacatcaag | 60  |
| attttgtacc | aaagcagtaa | gtattgttaa | gcatatgtaa | tgtcaaattt  | gttagcaata | 120 |
| ggcatagcag | cattaatagt | agcactaata | ataacaatag | ttgtgtggac  | tatagcatat | 180 |
| atagaatata | agaaactggt | aaggcaaaga | aaaataaata | ggttatataa  | aagaataagc | 240 |
| gaaagagcag | aagacagtg  | caatgagagt | gagggggatg | cagaggaatt  | ggcagcactt | 300 |
| ggggaagtgg | ggccttttat | tcctggggac | attaataatc | tgtaatgctg  | cagaaaactt | 360 |
| atgggttaca | gtctattatg | gggtacctgt | gtggaaagaa | gcaaccacta  | ctctattctg | 420 |
| tgcacagat  | gctaaatcat | atgaaaaaga | ggcacataat | gtctgggcta  | cacatgcttg | 480 |
| tgtaccaca  | gatcccaatc | cacaagaagt | agttctggaa | aatgtaacag  | aaaggtttaa | 540 |
| tatgtgggaa | aataacatgg | tagaacaaat | gcatacagat | ataatcagtt  | tatgggatca | 600 |
| aagcctaaag | ccatgtgtga | agttaacccc | actctgtgtt | acttttagatt | gtagaaacat | 660 |
| tgccaccaat | ggcaccaatg | acactattgc | catcaatgac | actctgaagg  | aagatccaga | 720 |
| ggcaatacaa | aactgttctt | tcaatacaac | cacagaaata | agagataagc  | agctgaaagt | 780 |
| acatgcactt | ttttataaac | ttgatatagt | acaaatcaac | aaggatgaca  | atagaacata | 840 |
| cagactaata | aattgtgatg | cctcaaccat | tacacaggct | tgtccaaagg  | tatcttggga | 900 |
| tccaattccc | atacattatt | gtgctccagc | tggttatgcg | attctaaagt  | gtaatgagaa | 960 |

|             |             |            |            |             |            |      |
|-------------|-------------|------------|------------|-------------|------------|------|
| aaatttcaca  | gggacagggg  | catgcaagaa | tgtcagtaca | gtacaatgta  | cacatggaat | 1020 |
| taaaccagtg  | gtatccactc  | aattgttggt | aaatggcagc | ctagcagaag  | gagagatagt | 1080 |
| aatcagatct  | caaaatatct  | cagataatgc | aaaaaccata | atagtgcacc  | ttaatgaatc | 1140 |
| tgtacagatt  | aattgtacaa  | gacccaacaa | caatacaaga | aaaagaatat  | ctttaggacc | 1200 |
| aggacgagta  | ttttatacaa  | caggagaaat | aataggagac | atcagaaagg  | cacattgtaa | 1260 |
| cgttagtgga  | acacaatgga  | ggaacacgtt | agcaaaggta | aaggcaaagt  | tagggctcta | 1320 |
| tttcccta    | gcaacaataa  | aatttaactc | atcctcagga | ggggacctag  | aaattacaag | 1380 |
| gcataat     | aattgtatgg  | gagaat     | ctactgtaat | acagatgaac  | tgtttaatga | 1440 |
| cacaaaatc   | aatgacacag  | gattcaatgg | cactatcact | ctcccatgtc  | gaataaaaca | 1500 |
| aattgtaaac  | atgtggcagg  | aagtgggacg | agcaatgtat | gccaatccca  | ttgcaggaaa | 1560 |
| cattacctgt  | aactcaaata  | ttacaggtct | gctattgaca | agagatgggtg | gtctgaatag | 1620 |
| tactaatgag  | accttcagac  | ctgggggagg | aaatatgaaa | gacaattgga  | gaagtgaatt | 1680 |
| atataaatat  | aaagtagtag  | aaattgaacc | actaggagta | gcacccacca  | aggcaaaaag | 1740 |
| acaagtgggtg | aagagagaaa  | gaagagcagt | gggactagga | gctctgttcc  | ttgggttctt | 1800 |
| gggagcagct  | ggaagcacta  | tgggcgcggc | gtcaataacg | ctgacggtag  | aggccagaca | 1860 |
| attattgtct  | ggaatagtgc  | aacagcagag | caatctgctg | agggtattg   | aagcgcaaca | 1920 |
| gcatctgttg  | cagctcacag  | tctggggcat | taaacagctc | caggcaagag  | tcctggctgt | 1980 |
| ggaaagatac  | ctaaaggatc  | aacagctcct | agggttttgg | ggctgctctg  | gaaaactcat | 2040 |
| ctgcaccact  | aatgtgccct  | ggaactctag | ttggagtaat | aaatctcttg  | aggagatttg | 2100 |
| ggggaacatg  | acctggatgg  | agtgggaaaa | agaggttagc | aattactcaa  | aagaaatata | 2160 |
| caggttaatt  | gaagactcgc  | agaaccagca | ggaaaagaat | gaacaagaat  | tattagcatt | 2220 |
| ggacaaatgg  | gcaagtctgt  | ggaattgggt | tgacataaca | cagtggctgt  | ggtatataaa | 2280 |
| aatattcata  | atgatagtag  | gaggcttgat | aggcttaaga | atagttttta  | ctgtgctttc | 2340 |
| tatagtaaat  | agagttagga  | agggatactc | acctttgtca | tttcagaccc  | atatcccaag | 2400 |
| cccagaggaa  | cccagacaggc | ccgaaggaat | cgaagaagga | ggtggagagc  | aaggcaaaga | 2460 |
| cagatccgtg  | agattagtag  | ccggattctt | agctcttgcc | tgggacgacc  | tgcggaacct | 2520 |
| gtgcctcttc  | agctaccgcc  | acttgagaga | cttcatatta | attgcagcga  | ggattgtgga | 2580 |
| cagggggctg  | aagaggggggt | gggaagctct | caaatatctg | gggaatctca  | cacagtattg | 2640 |
| gggtcaggaa  | ctaaagaata  | g          |            |             |            | 2661 |

<210> 17

<211> 246

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR020; gene=vpu

<400> 17

|            |            |            |            |            |            |     |
|------------|------------|------------|------------|------------|------------|-----|
| atgtcaaatt | tgtagcaat  | aggcatagca | gcattaatag | tagcactaat | aataacaata | 60  |
| gttgtgtgga | ctatagcata | tatagaatat | aagaaactgg | taaggcaaag | aaaaataaat | 120 |
| aggttatata | aaagaataag | cgaaagagca | gaagacagtg | gcaatgagag | tgagggggat | 180 |
| gcagaggaat | tggcagcact | tggggaagtg | gggcctttta | ttcctgggga | cattaataat | 240 |
| ctgtaa     |            |            |            |            |            | 246 |

<210> 18

<211> 2541

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR020; gene=env

<400> 18

```
atgagagtga gggggatgca gaggaattgg cagcacttgg ggaagtgggg ccttttattc 60
ctggggacat taataatctg taatgctgca gaaaacttat gggttacagt ctattatggg 120
gtacctgtgt ggaaagaagc aaccactact ctattctgtg catcagatgc taaatcatat 180
gaaaaagagg cacataatgt ctgggctaca catgcttgtg taccacaga tcccaatcca 240
caagaagtag ttctggaaaa tgtaacagaa aggtttaata tgtgggaaaa taacatggta 300
gaacaaatgc atacagatat aatcagttta tgggatcaaa gcctaaagcc atgtgtgaag 360
ttaacccac tctgtgttac tttagattgt agaaacattg ccaccaatgg caccaatgac 420
actattgcc tcaatgacac tctgaaggaa gatccagagg caatacaaaa ctgttctttc 480
aatacaacca cagaaataag agataagcag ctgaaagtac atgcactttt ttataaactt 540
gatatagtac aaatcaacaa ggatgacaat agaacataca gactaataaa ttgtgatgcc 600
tcaaccatta cacaggcttg tccaaaggta tcttgggata caattcccat acattattgt 660
gctccagctg gttatgcat tctaaagtgt aatgagaaaa atttcacagg gacagggtca 720
tgcaagaatg tcagtacagt acaatgtaca catggaatta aaccagtggt atccactcaa 780
ttgttggtta atggcagcct agcagaagga gagatagtaa tcagatctca aaatatctca 840
gataatgcaa aaaccataat agtgcacctt aatgaatctg tacagattaa ttgtacaaga 900
ccaacaaca atacaagaaa aagaatatct ttaggaccag gacgagtatt ttatacaaca 960
ggagaaataa taggagacat cagaaaggca cattgtaacg ttagtggaac acaatggagg 1020
aacacgttag caaaggtaaa ggcaaagtta gggctcttatt tccctaattgc aacaataaaa 1080
tttaactcat cctcaggagg ggacctagaa attacaaggc ataattttta ttgtatggga 1140
gaatttttct actgtaatac agatgaactg tttaatgaca caaaattcaa tgacacagga 1200
ttcaatggca ctatcactct cccatgtcga ataaaacaaa ttgtaaacad gtggcaggaa 1260
gtgggacgag caatgtatgc caatcccat gcaggaaaca ttacctgtaa ctcaaatatt 1320
acaggctctg tattgacaag agatggtggt ctgaatagta ctaatgagac cttcagacct 1380
gggggaggaa atatgaaaga caattggaga agtgaattat ataaatataa agtagtagaa 1440
attgaaccac taggagtagc accaccaag gcaaaaagac aagtggtgaa gagagaaaga 1500
agagcagtgg gactaggagc tctgttcctt gggttcttgg gagcagctgg aagcactatg 1560
ggcgcgcggt caataacgct gacggtacag gccagacaat tattgtctgg aatagtgcaa 1620
cagcagagca atctgctgag ggctattgaa gcgcaacagc atctgttgca gctcacagtc 1680
tggggcatta aacagctcca ggcaagagtc ctggctgtgg aaagatacct aaaggatcaa 1740
cagctcctag ggctttgggg ctgctctgga aaactcatct gcaccactaa tgtgccctgg 1800
aactctagtt ggagtaataa atctcttgag gagatttggg ggaacatgac ctggatggag 1860
tgggaaaaag aggttagcaa ttactcaaaa gaaatataca ggttaattga agactcgcag 1920
aaccagcagg aaaagaatga acaagaatta ttagcattgg acaaatgggc aagtctgtgg 1980
aattggtttg acataacaca gtggctgtgg tatataaaaa tattcataat gatagtagga 2040
ggcttgatag gcttaagaat agtttttact gtgctttcta tagtaaatag agttaggaag 2100
ggatactcac ctttgtcatt tcagacccat atcccaagcc cgagggaacc cgacaggccc 2160
gaaggaatcg aagaaggagg tggagagcaa ggcaaagaca gatccgtgag attagtgacc 2220
ggattcttag ctcttgcttg ggacgacctg cggaaacctg gcctcttcag ctaccgccac 2280
ttgagagact tcatattaat tgcagcgagg attgtggaca gggggctgaa gaggggggtg 2340
gaagctctca aatatctggg gaatctcaca cagtattggg gtcaggaact aaagaatagt 2400
gctattagct tgcttaatgc cacagcaata gcagtagctg agtggacaga tagagttata 2460
gaagctttgc aaagagctgg tagagctatt ctcaacatac ctagaagaat aagacagggc 2520
```

ttggaaaggg ctttgctata a

2541

<210> 19

<211> 27

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR020; gene=nef

<400> 19

atgggtggca agtgggtcaaa aagtagt

27

<210> 20

<211> 8

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR020; gene=gag-pol fusion

<400> 20

aaaaaaaa

8

<210> 21

<211> 207

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG083; gene=gag

<400> 21

gtgggtgcga gagcgtcagt attaagcggg ggaaaattag attccttgga aaaaattcgg 60  
ttaaggccag ggggaaggaa aaagtataaa ctaaaacata tagtatgggc aagcagggaa 120  
ctggggagat ttgcacttaa ccgtgacctt ttagaaacag cagaagggtg tgtgcaaata 180  
atgaaacagt tgcaaccagc tctctag 207

<210> 22

<211> 2739

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG083; gene=pol; note=NH2-terminus  
uncertain

<400> 22

|             |             |            |            |            |             |      |
|-------------|-------------|------------|------------|------------|-------------|------|
| ataaatttac  | caggaaaatg  | gaaacccaaa | atgatagggg | gaattggagg | ttttatcaaa  | 60   |
| gtaagacagt  | atgatcaaat  | acttatagaa | attggtggaa | aaaaggctat | agggacagta  | 120  |
| ttagtaggac  | ctacacctat  | taacataatt | gggagaaata | tgttgactca | gattggttgt  | 180  |
| actttaaact  | ttccaataag  | tcctattgaa | actgtaccag | taaaattaaa | gccaggaatg  | 240  |
| gatggcccaa  | gggttaaaca  | atggccattg | acagaagaga | aaataaaagc | attaacagaa  | 300  |
| atgtgtaaag  | acatggaaaa  | ggaaggaaaa | atttcaaaaa | ttgggcctga | aaatccatat  | 360  |
| aacactccaa  | tattcgccat  | aaagaaaaaa | gacagtacta | aatggagaaa | attggtagat  | 420  |
| ttcagagaac  | ttaataaaaag | aactcaagac | ttctgggagg | tccaattagg | aatacctcac  | 480  |
| cccgcggggt  | taaaaaagaa  | aagatcagta | acggtactag | atgtgggaga | tgcatacttt  | 540  |
| tcagttccct  | tagataaaga  | ctttagaaag | tatactgcat | ttactatacc | tagtataaat  | 600  |
| aatgagacac  | cagggattag  | atatcaatac | aatgtgcttc | cacagggatg | gaaaggatca  | 660  |
| ccagcaatat  | ttcagagtag  | catgacaaaa | attttagagc | cttctagaac | aaaaaatcca  | 720  |
| gaaatggtga  | tctaccaata  | catggatgat | ttatatgtag | gatctgactt | agaaataggg  | 780  |
| cagcatagag  | caaaaataga  | ggagttaaga | gaacatctac | tgaaatgggg | attgaccaca  | 840  |
| ccagataaaa  | aacatcagaa  | agaacctcca | ttcctttgga | tgggatatga | gctccatcct  | 900  |
| gacaaatgga  | cggtagaacc  | tatacagctg | ccagaaaagg | aagattggac | tgtcaatgat  | 960  |
| atacaaaagt  | tagtgggaaa  | actaaattgg | gcaagtcaga | tttatccagg | gattaaagta  | 1020 |
| aagcacctat  | gtagactcct  | tagggggggc | aaagcactaa | cagacatagt | acccttaacg  | 1080 |
| gcagaagcag  | aatggagct   | ggcagagAAC | agggaaattc | taaaagaacc | tgtacatgga  | 1140 |
| gtctatcatg  | acccatcaaa  | agaattaata | gcagaagtac | agaagcaagg | gccagaccaa  | 1200 |
| tggacatatc  | aaatttatca  | agagccatac | aaaaatctaa | aaacaggaaa | atatgcaaaa  | 1260 |
| aggggggtctg | cccacactaa  | tgatgtaaaa | caattaacag | aagtagtgca | aaaaatagcc  | 1320 |
| acagagggca  | tagtaatctg  | gggaaagatt | cctaaattta | aactacctat | acgaaaagaa  | 1380 |
| acatgggaag  | tatggtggac  | agagtactgg | caggccgcct | ggattcctga | gtgggagttt  | 1440 |
| gtcaataccc  | ctcctctagt  | aaaactatgg | tatcaattag | aaacagaacc | cataccagga  | 1500 |
| gcagaaactt  | actatgtaga  | tggggcagct | aatagggaga | caaaattagg | aaaggcagga  | 1560 |
| catgttactg  | acaaaggaaa  | acaaaaaatt | attaccctaa | ctgaaacaac | aaacccaaaag | 1620 |
| gctgaattac  | atgcaattca  | actagctttg | caggactcaa | gaccagaagt | aaacatagta  | 1680 |
| acagactcac  | agtatgcatt  | aggaatcatt | caagcacaac | cagataggag | tggatcagaa  | 1740 |
| ttagtcaatc  | aaataataga  | acagctaata | aaaaaggaaa | aggtctacct | gtcatgggta  | 1800 |
| ccagcacaca  | aagggaattg  | aggaaatgaa | caagtagata | agctagtcag | tagtggaatc  | 1860 |
| aggaagtat   | tattttttgga | tggcatagat | aaagcccaag | agaacatga  | aagatatcac  | 1920 |
| agcaattgga  | gagcaatggc  | tagtgatttt | aatctgccac | ctgtagtagc | aaaagaaata  | 1980 |
| gtggccagct  | gtgataaatg  | tcaactaaaa | ggggaagcca | tgcatggaca | agtagactgt  | 2040 |
| agtccaggaa  | tatggcaatt  | agattgtaca | catttagaag | gaaaaattat | catagtagca  | 2100 |
| gttcatgtag  | ccagtggcta  | tatagaagca | gaagttatcc | cagcagaaac | agggcaggaa  | 2160 |
| acagcatact  | ttatattaaa  | attagcagga | aggtggccag | taaaagtgat | acatacagac  | 2220 |
| aatggtccca  | atttcatcag  | tgctgcagta | aaggcagcat | gttggtgggc | aaatatcaca  | 2280 |
| caggaatttg  | gaattcccta  | caatcccca  | agccaaggag | tagtggaatc | tatgaataag  | 2340 |
| gaattaaaga  | aaatcatcgg  | acaggttgga | gatcaagctg | aacatcttaa | gacagcagta  | 2400 |
| cagatggcag  | tattcattca  | caatttttaa | agaaaagggg | ggattggggg | gtacagtgca  | 2460 |
| ggggaaagaa  | taatagacat  | aatagcatca | gatatacaaa | ctaaagaact | acaaaaacaa  | 2520 |
| attataaaaa  | ttcaaaattt  | tcgggtttat | tacagggaca | gcagagaccc | aatttgga    | 2580 |
| ggaccagcaa  | agctactctg  | gaaaggtgaa | ggggcagtag | taatacagga | caataacgaa  | 2640 |
| ataaaggtag  | taccaagaag  | aaaagcaaa  | atccttaagg | attatggaaa | acagatggca  | 2700 |
| ggtggtgatt  | gtgtggcagg  | tagacaggat | gaggattag  |            |             | 2739 |

<210> 23

<211> 579  
<212> DNA  
<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG083; gene=vif

<400> 23

```
atggaaaaca gatggcaggt ggtgattgtg tggcaggtag acaggatgag gattagaaca 60
tggaacagtt tagtaaaaca tcatatgtat gtctcaaaga aagctaaagg ctggttttat 120
agacatcact atgaaagcag gcatccaaga gtaagttcag aagtacacat cccactaaga 180
gatgctacac tagtagtaag aacatattgg ggtctgcatg caggagaaaa agactggcaa 240
ttgggccatg gggtttccat agaatggagg cagaaaagat atagtacaca aatagaccct 300
aacacagcag accatctgat tcatctgtat tattttgact gtttttcaga atctgccata 360
agaaaagcca tattaggaga gatagttagc cctaggtgtg aatacccagc aggacataat 420
aaggtaggat ctctacaata tctggcatcg aaagcattag taacaccaac aaggaaaagg 480
ccacctttgc caagtgttgg gaaattagca gaagatagat ggaacaagcc ccagaagacc 540
agggaccaca gagagaaccc tacaatgaat ggacattag                               579
```

<210> 24

<211> 291

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG083; gene=vpr

<400> 24

```
atggaacaag cccagaaga ccagggacca cagagagaac cctacaatga atggacatta 60
gaactgttag aagagcttaa aaatgaagct gttagacatt ttcctaggcc ctggctccat 120
ggcttaggac agtatatcta taacacttat ggggatactt gggaaggagt tgaagccata 180
ataagaatac tacaacaact actgtttatc catttcagaa tcgggtgcc aatagcaga 240
ataggcatta ctccacagag aagagtaagg gatggaccgc gtagacccta a                291
```

<210> 25

<211> 2597

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG083; gene=tat

<400> 25

```
atggaccgcg tagaccctaa gctagagccc tggaatcatc cggggagtca gcctacaact 60
ccctgtaaca aatgttattg taaagtgtgc tgctggcatt gtcaagtttg ctttttaaac 120
aaaggcttag gcatctccta tggcaggaag aagcggagac cccgacgagg aactcctcag 180
ggcagtaagg atcatcaaaa ccctgtacca aagcagtaag tagtaacaat taatatatgt 240
aatgcaggcc ttagaaatat ctgactaata gtagcattca tagcagccac aattgtgtgg 300
```

```

agtatagtat ttatagaata tagaaaaata agaaaacaga aaaaaataga aaagttactt 360
gatagaataa gagaaagagc agaagacagt ggaaatgaga gtgaagggga tacagaggaa 420
ttggcaacac ttatggaaat gggggacttt gatccttggg ttggtaataa tttgtagtgc 480
ctcagataac ttgtgggtca cagtctatta tgggggtacct gtgtgggaag atgcagatac 540
ccccctattc tgtgcctctg atgctaaatc atatatgttct gaaaaacata atgtctgggc 600
tacacatgcc tgtgtaccca cagaccctaa cccacaagaa atagctatag aaaatgtaac 660
agaaaatttt aacatgtgga agaataacat ggtagaacag atgcaggagg atataatcag 720
tttatgggag gaaagcctaa agccatgtgt aaagctaact cctctctgta tcactttaaa 780
ctgtactaat gtaaacagtg ctaatcatatc tgaggccaat aacactgtag aaaacaaaga 840
agaaataaaa aactgctctt tcaagataac cacagaaagg ggaggcaaga agaaggaaga 900
atacgcgctt ttctataaac ttgatgtggt accaattagt aatgggaata agactagtta 960
taggctaata cattgtaatg tctcaaccat taaacaggct tgtccaaagg taaattttga 1020
cccaattccc atacattatt gtgctccagc tgggttttgcg atttttaaagt gtagggataa 1080
ggagtacaat ggaacaggac catgtaaaaa tgtcagtaca gtacaatgta cacatggaat 1140
taagccagtg gtatcaactc aactactgct gaatggcagt ttagcagaag aagatataag 1200
aattagatct gaaaatttca cagacaatac caaagtcata atagtgcagc ttaataatag 1260
tatagaaatt aattgtatca gaccaataa caatacaaga aaaagtatac caatcggacc 1320
aggacaagcg ttctatgcaa caggtgatat aataggagac ataagacaag cacattgtaa 1380
tgtagtaga ataaaatgga gggagatgtt aaagaatgtc acagcacagc taaggaaaat 1440
ctataataat aagaacataa cctttaactc atctgcagga ggggacctag aaattacaac 1500
acatagtttc aattgtagag gagagttttt ctattgcaat acatcaggac tgtttaataa 1560
taatattagt aatattaata atgagactat cacactccca tgtaaaataa aacaaattgt 1620
gaggatgtgg cagaaagtgg gacaagcaat gtatgccctt cccatcgag gaaaccttgt 1680
atgtaaatca aacattacag gattaatatt aacaagagat ggtgggaata acaatgacag 1740
tacagaggag accttcagac ctggaggagg agatatgagg gacaattgga gaagtgaatt 1800
atataagtat aaaacagtaa aaatcaaate actaggagta gcacccacca gggcaaggag 1860
aagagtgggt gagagagaaa aaagagcagt tggactggga gctgtcttcc ttgggttctt 1920
aggagcagca gggagcacta tgggcgcggc gtcaataacg ctgacggcac aggtcagaca 1980
attattgtct ggcatagtgc aacagcaaag caatttgctg agggctatag aggcgcagca 2040
gcatctgttg caactcacag tctggggcat taaacagctc cagtcaagag tcctggctat 2100
agaaagatac ctaaaggatc aacagctcct agggatttgg ggctgctctg gaaaactcat 2160
ctgcaccact aatgtgccct ggaacactag ttggagtaat aaatcttata atgagatttg 2220
ggataacatg acttggctag aatgggaaag ggaaattcac aattacacac aacacatata 2280
cagcctgatt gaagaatcgc agaaccagca ggaaaagaat gaacaagact tattggcatt 2340
ggacaagtgg gcaagtttgt ggaattgggt tgacatatca aattggctat ggtatataag 2400
aatattcata atgatagtag gaggtttaat aggtttaaga atagtttttg ctgtgctttc 2460
tatagtaa atagtttaggc agggatactc acctttgtcg ttccagacct ttacctatca 2520
ccagcgggaa cccgacaggc tcggaaaaac cgaagaagga ggtggcgagc aagacagaga 2580
cagatccact cgattag 2597

```

<210> 26

<211> 2663

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG083; gene=rev

<400> 26

```
atggcaggaa gaagcggaga ccccgacgag gaactcctca gggcagtaag gatcatcaaa 60
accctgtacc aaagcagtaa gtagtaacaa ttaatatatg taatgcaggc cttagaaata 120
tctgactaat agtagcattc atagcagcca caattgtgtg gagtatagta tttatagaat 180
atagaaaaat aagaaaacag aaaaaaatag aaaagttact tgatagaata agagaaagag 240
cagaagacag tggaaatgag agtgaagggg atacagagga attggcaaca cttatggaaa 300
tgggggactt tgatccttgg gttggtaata atttgtagtg cctcagataa cttgtgggtc 360
acagtctatt atgggggtacc tgtgtgggaa gatgcagata cccccctatt ctgtgcctct 420
gatgctaaat catatagtcc tgaaaaacat aatgtctggg ctacacatgc ctgtgtaccc 480
acagacccta acccacaaga aatagctata gaaaatgtaa cagaaaattt taacatgtgg 540
aagaataaca tggtagaaca gatgcaggag gatataatca gtttatggga ggaaagccta 600
aagccatgtg taaagctaac tcctctctgt atcactttaa actgtactaa tgtaaacagt 660
gctaatacata ctgaggccaa taacactgta gaaaacaaag aagaaataaa aaactgctct 720
ttcaagataa ccacagaaag gggaggcaag aagaaggaag aatacgcgct tttctataaa 780
cttgatgtgg taccaattag taatgggaat aagactagtt ataggctaat acattgtaat 840
gtctcaacca ttaaacaggc ttgtccaaag gtaattttg acccaattcc catacattat 900
tgtgtctccag ctggttttgc gatttttaaag tgtagggata aggagtacaa tggaaacagga 960
ccatgtaaaa atgtcagtag agtacaatgt acacatggaa ttaagccagt ggtatcaact 1020
caactactgc tgaatggcag ttttagcagaa gaagatataa gaattagatc tgaaaatttc 1080
acagacaata ccaaagtcac aatagtgcag cttataataa gtatagaaat taattgtatc 1140
agacccaata acaatacaag aaaaagtata ccaatcggac caggacaagc gttctatgca 1200
acaggtgata taataggaga cataagacaa gcacattgta atgttagtag aataaaatgg 1260
aggagatgt taaagaatgt cacagcacag ctaaggaaaa tctataataa taagaacata 1320
acctttaact catctgcagg aggggaccta gaaattacaa cacatagttt caattgtaga 1380
ggagagtfff tctattgcaa tacatcagga ctgtttaata ataattattag taattattaat 1440
aatgagacta tcacactccc atgtaaaata aaacaaattg tgaggatgtg gcagaaagtg 1500
ggacaagcaa tgtatgccct tcccatcgca ggaaaccttg tatgtaaatc aaacattaca 1560
ggattaatat taacaagaga tgggtgggaat aacaatgaca gtacagagga gaccttcaga 1620
cctggaggag gagatatgag ggacaattgg agaagtgaat tatataagta taaaacagta 1680
aaaatcaaat cactaggagt agcaccacc agggcaagga gaagagtggg ggagagagaa 1740
aaaagagcag ttggactggg agctgtcttc cttgggttct taggagcagc agggagcact 1800
atgggcgcgg cgtcaataac gctgacggca caggctcagac aattattgtc tggcatagtg 1860
caacagcaaa gcaatttgct gagggctata gaggcgcagc agcatctgtt gcaactcaca 1920
gtctggggca ttaaacagct ccagtcaaga gtccctggcta tagaaagata cctaaaggat 1980
caacagctcc tagggatttg gggctgctct ggaaaactca tctgcaccac taatgtgccc 2040
tggaaacta gttggagtaa taaatcttat aatgagattt gggataacat gacttggcta 2100
gaatgggaaa gggaaattca caattacaca caacacatat acagcctgat tgaagaatcg 2160
cagaaccagc aggaaaagaa tgaacaagac ttattggcat tggacaagtg ggcaagtttg 2220
tggaaattgg ttgacatatc aaattggcta tggatatataa gaatattcat aatgatagta 2280
ggaggtttaa taggtttaag aatagttttt gctgtgcttt ctatagtaaa tagagttagg 2340
cagggatact cacctttgtc gttccagacc cttaccatc accagcggga acccgacagg 2400
ctcggaaaaa ccgaagaagg aggtggcgag caagacagag acagatccac tcgattagtg 2460
agcggattct tagcgtttgc ctgggacgac ctgcggagcc tgtgcctttt cagctaccac 2520
cgcttgaggg acttagtctt gattgcagca aggacggtgg aacttctggg acgcagcagc 2580
ctcaagggac tgagactggg gtgggaaggc ctcaagtact tgtggaacct cctgttgtat 2640
tggggtcggg aactaaagaa tag 2663
```

<210> 27



<211> 26  
<212> DNA  
<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG083; gene=vpu (defective); note=10 bp  
deletion early in vpu frameshifts, results in  
premature termination

<400> 27

tgcaggcctt agaaatatct gactaa

26

<210> 28

<211> 2550

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG083; gene=env

<400> 28

```
atgagagtga aggggataca gaggaattgg caacacttat ggaaatgggg gactttgatc 60
cttgggttgg taataatttg tagtgccctca gataacttgt gggtcacagt ctattatggg 120
gtacctgtgt gggaagatgc agataccccc ctattctgtg cctctgatgc taaatcatat 180
agttctgaaa aacataatgt ctgggctaca catgcctgtg taccacaga ccctaacca 240
caagaaatag ctatagaaaa tgtaacagaa aattttaaca tgtggaagaa taacatggta 300
gaacagatgc aggaggatat aatcagttta tgggaggaaa gcctaaagcc atgtgtaaaag 360
ctaactctc tctgtatcac tttaaactgt actaatgtaa acagtgctaa tcatactgag 420
gccaataaca ctgtagaaaa caaagaagaa ataaaaaact gctctttcaa gataaccaca 480
gaaaggggag gcaagaagaa ggaagaatac gcgcttttct ataaacttga tgtggtacca 540
attagtaatg ggaataagac tagttatagg ctaatacatt gtaatgtctc aaccattaaa 600
caggcttgtc caaaggtaaa ttttgaccca attcccatac attattgtgc tccagctggt 660
tttgcgattt taaagtgtag ggataaggag tacaatggaa caggaccatg taaaaatgtc 720
agtacagtac aatgtacaca tggaattaag ccagtgggat caactcaact actgctgaat 780
ggcagtttag cagaagaaga tataagaatt agatctgaaa atttcacaga caataccaaa 840
gtcataatag tgcagcttaa taatagtata gaaattaatt gtatcagacc caataacaat 900
acaagaaaaa gtataccaat cggaccagga caagcgttct atgcaacagg tgatataata 960
ggagacataa gacaagcaca ttgtaatgtt agtagaataa aatggaggga gatgttaaag 1020
aatgtcacag cacagctaag gaaaatctat aataataaga acataacctt taactcatct 1080
gcaggagggg acctagaaat tacaacacat agtttcaatt gtagaggaga gtttttctat 1140
tgcaatacat caggactgtt taataataat attagtaata ttaataatga gactatcaca 1200
ctcccatgta aaataaaaaca aattgtgagg atgtggcaga aagtgggaca agcaatgtat 1260
gcccttccca tcgcaggaaa ccttgatatg aaatcaaaaa ttacaggatt aatattaaca 1320
agagatggtg ggaataacaa tgacagtaca gaggagacct tcagacctgg aggaggagat 1380
atgaggggaca attggagaag tgaattatat aagtataaaa cagtaaaaat caaatcacta 1440
ggagtagcac ccaccagggc aaggagaaga gtggtggaga gagaaaaaag agcagttgga 1500
ctgggagctg tcttccttgg gttcttagga gcagcaggga gcactatggg cgcggcgtca 1560
ataacgctga cggcacaggt cagacaatta ttgtctggca tagtgcaaca gcaaagcaat 1620
```

```

ttgctgaggg ctatagaggc gcagcagcat ctgttgcaac tcacagtctg gggcattaaa 1680
cagctccagt caagagtcct ggctatagaa agatacctaa aggatcaaca gctcctaggg 1740
at ttgggggct gctctggaaa actcatctgc accactaatg tgccctggaa cactagttagg 1800
agtaataaat cttataatga gatttgggat aacatgactt ggctagaatg ggaaagggaa 1860
attcacaatt acacacaaca catatacagc ctgattgaag aatcgagaa ccagcaggaa 1920
aagaatgaac aagacttatt ggcattggac aagtgggcaa gtttgtggaa ttggtttgac 1980
atatcaaatt ggctatggta tataagaata ttcataatga tagtaggagg ttaatatagg 2040
ttaagaatag tttttgctgt gctttctata gtaaataagag ttaggcaggg atactcacct 2100
ttgtcgttcc agacccttac ccatcaccag cggaacccg acaggctcgg aaaaaccgaa 2160
gaaggagggtg gcgagcaaga cagagacaga tccactcgat tagtgagcgg attcttagcg 2220
cttgccctggg acgacctgcg gagcctgtgc cttttcagct accaccgctt gagggactta 2280
gtcttgattg cagcaaggac ggtggaactt ctgggacgca gcagcctcaa gggactgaga 2340
ctgggggtggg aaggcctcaa gtacttgtgg aacctcctgt tgtattgggg tcgggaacta 2400
aagaatagtg ctattaat ttt gcttgataca atagcaatag caacagctaa cgggacagat 2460
agggttatag aagtagcaca aagagcttat agagctattc tcaacgtacc tacaaggata 2520
agacaaggct tagaaagagc tttgctataa 2550

```

<210> 29

<211> 1503

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=90CR056; gene=gag; CDS:  
join(137..1434,1434..4443)

<400> 29

```

atgggtgcga gagcgtcagt attaagcggc ggaaaattag atgcttggga gaaaattcgg 60
ctaaggccag ggggaaagaa aaaatatagg ctaaaacatc tagtatgggc aagcaggag 120
ctggaaagat ttgcacttaa ccccggcctt ttagaaacac cagaaggctg tctacagata 180
atagaacaga tacagccagc tattaagaca ggaacagaag aacttaaadc attatttaat 240
ctagtagcag tcctctattg cgtacatcga aaaatagatg tgaaagacac caaggaggct 300
ttagataaga tagaggaaat acaaaacaaa agtcagcaaa aaacacagca agcagcagct 360
gataaggaaa aagacaacaa ggtcagtcga aattatccta tagtacagaa tgctcaaggg 420
cagatggtac accaggccat atcacctagg accttaaatg catgggtaaa agtagtagaa 480
gaaaaggctt ttagccaga agtaataccc atgttttcag cattatcaga aggagccacc 540
ccacaagact taaatgctat gctaaatata gtggggggac atcaagcagc catgcagatg 600
ttaaagata caatcaatga ggaagctgca gaatgggaca ggtacatcc agtgcattgca 660
gggcctattc caccaggcca aatgagagaa ccaaggggaa gcgatatagc aggaactact 720
agtacctgac aggaacaaat agcatggatg acaggcaatc cagctatccc agtgggagac 780
atctataaaa gatggataat cctgggatta aataagatag taagaatgta tagtcctgtc 840
agcattctgg acataaaaca agggccaaaa gaaccttta gagactatgt agacagggtt 900
tttaaaactt taagagctga gcaagccaca caggatgtga agaattggat gacagaaacc 960
ttgttggtcc aaaatgcaaa tccagattgc aagactatat taagagcatt aggacaaggg 1020
gcttcaatag aagaaatgat gacagcatgt caggaggatg gaggacctag tcataaagca 1080
agagtttttg ctgaggcaat gagccaagta acaaatataa atacagccat aatgatgcag 1140
aaaggcaact ttaagggcca aagaaaat ttt gttaaattgct tcaactgtgg caaagaggga 1200
cacatagcca gaaattgcag ggcccctagg aaaaagggct gttggaaatg tggaagagaa 1260

```

ggacatcaga tgaaagactg cacagagaga caggctaatt ttttagggaa aatttggcct 1320  
 tccagcaaag ggaggccagg aaattttctc cagagcaggc cagaaccaac agccccacca 1380  
 gcagagagct tcgggttcgg agaggagatg acccctctc cgaagcagga gcagctgaag 1440  
 gacaaggaac ctcccttagc ttccctcaga tcaactcttg gcagcgaccc cttgttacag 1500  
 taa 1503

<210> 30  
 <211> 579  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

<220>  
 <223> isolate=90CR056; gene=vif

<400> 30  
 atggaaaaca gatggcaggat gatgattgtg tggcaagtag acaggatgag gattaacaca 60  
 tggaaaagct tagtaaagta ccatatgcat atttcaagga aagctagagg atggttttat 120  
 agacatcatt ttgaaagcac tcatccaagg ataagttcag aagtacacat cccattagga 180  
 gaagctaggat tagtcataac cacatactgg ggtctgaata caggagaaaag agaatggcat 240  
 ttaggccagg gagtctccat agaatggaga ctgaaaaggat atagcacaca agtagagcct 300  
 ggcttgagcag accaactaat tcatatgcat tattttgatt gtttttcaga atctgccata 360  
 aggaaagcca tattaggacg tgtagttaga cctagggtgta actatccagc aggacataaa 420  
 caggtaggaa ctctacaata cttggcatta acagcattag tggcaccaaa aaagataaag 480  
 ccacctttgc ctagtgttag aaagctagta gaggatagat ggaacaagcc ccagaagacc 540  
 agggggccaca gagggagcca cacaatgaat ggacactag 579

<210> 31  
 <211> 291  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

<220>  
 <223> isolate=90CR056; gene=vpr

<400> 31  
 atggaacaag cccagaaga ccaggggcca cagagggagc cacacaatga atggacacta 60  
 gagcttttag aggagattaa gaatgaggct gttaggcatt ttcctagagt atggctccat 120  
 caattaggac agcatatcta taacacctat ggagatactt gggtaggagt tgaagcttta 180  
 ataagaacgc tgcaacaact actgtttatt catttcagaa ttgggtgcca acatagcaga 240  
 ataggaatta ctgcacagag aagagtaaga aatggacca gtagatccta a 291

<210> 32  
 <211> 624  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

<220>  
 <223> isolate=92NG083; gene=nef

<400> 32

```
atgggggggca agtgggtcaaa aagtagcata gttggatggc ctcagataag ggaaagaata 60
agacaaactc ctgtagcagc agaaggagta ggagcagtat ctcaagattt agctaggcat 120
ggagcaatca caagcagcaa tacagcaacc aacaatcctg attgtgcctg gctggaagca 180
caagaggagg actcagatgt aggctttccg gtcagaccac aggtaccttt gagaccaatg 240
acttataagg ctgcttttga tctcagcttc tttttaaaag aaaagggggg actggatggg 300
ctaatttact ccaagagaag acaagacatc cttgatctat gggctctataa tacacaagga 360
ttcttccag attggcagaa ctacacacca gggccaggga ctagactccc actgaccttt 420
gggtgggtgct tcaaactagt accaatggac ccagcagaga tagaggaagc caataagggg 480
gagaacatca gtctattaca ccccatctgc cagcatggaa tggaggatga agacagagaa 540
gtgctggtat ggagatttaa cagtagccta gcacggagac acctagcccg agagctgcat 600
ccggagtact acaaagactg ctga 624
```

<210> 33

<211> 2606

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=90CR056; gene=tat; CDS: join (5177..5391,  
7698..7782)

<400> 33

```
atggaccag tagatcctaa actagagccc tggaaaccatc caggaagtca gcctcaaact 60
gcttgtaaca attgttattg taaaaagtgc tgctatcatt gccaaatgtg ctttttaaag 120
aaaggcttag gaatttccta tggcaggaag aagcggagcc agcgacacag aactcctgca 180
agtttgcaag atcatcaaaa ttctatatca aagcagtaag tattatcata aatgtatata 240
ttaggattag gaataggagc gctagtagta acatttatca tagccgtaat tgtgtggacc 300
atagtatata tagaatataa aaaattggta aggcataaga aaatagacag gctaattgaa 360
agaataggag aaagagcaga agacagtggc aacgagagtg atggagacac agaggaatta 420
tccaagctta tggagatggg gcaccttaat cttgggtatg ttgctgatct gtagtgctgc 480
acaaaacttg tgggttacag tatattatgg ggtacctgtg tggaaagagg caaaaaccac 540
tctattctgt gcatcagatg ctaaggcata tgagacagaa aagcataatg tctgggctac 600
acatgcatgt gtaccacag accccaaccc acaagagatg gtcattggaga atgtaacaga 660
gagctttaat atgtgggaaa ataacatggg ggagcagatg catacagaca taatcagttt 720
atgggatcaa agcttgaaac catgtgtaaa attaacccca ctctgtgtta ctctaaactg 780
tactaatgtc agaaacaata cctctaacag cactagcagt atggaggcag gaggggaact 840
aacaattgct tctttcaatg taactacagt actaagagat aagcagcaga aagtacatgc 900
actcttttat agacttgatg tagtaccat tgataacaat agtactcagt ataggctaata 960
aaattgtaat acctcagtca ttacacaggc ttgcccagg gtgtcctttg aacctattcc 1020
catacattat tgtgctccag ctggctttgc gattctaaag tgtaacaata aaacattcaa 1080
tggaaacagga ttatgtacaa atgtcagtac agtacaatgt acacatggaa ttagaccagt 1140
ggtatcaact caactgctat taaatggaag cctagcagaa gaacagatca taattagaac 1200
taaaaatatc tcagacaata ccaaaaacat aatagtagag cttaagacac cagtaaacaat 1260
tacatgtacc aggcctaaca ataatacag aacaagtata catttagggc caggacgagc 1320
attctatgca acaggtgaca tcataggaga tataagacaa gcacattgta atattagtag 1380
aacagactgg aataagactt tacaccaggt agttacacaa ttaggaatac acttgaacaa 1440
```

```

tagaacaata agctttaagc caaactcagg aggggacatg gaagttagaa cacatagttt 1500
taattgtaga ggagaatttt tctattgcaa tacatcaggg ctgtttaata gtagttggga 1560
aatgcatact aattacacat caaatgacac aaagggaac gaaaacatta cactgccatg 1620
cagaataaaa caaattgtaa acatgtggca gagagtagga cgagcaatgt atgccccctc 1680
catccaagga aacattatgt gtgtatcaaa tattacagga ctaatattga caattgacga 1740
gggtaacgcg tctgcagaaa attatacctt cagacctgga ggaggagata tgagggacaa 1800
ttggagaagt gaattgtata aatataaagt agtaaaaatt gaaccactgg gaatagcacc 1860
caccaagaca aggagaagag tgggtggagag agaaaaaaga gcagtgggaa tgggagcttc 1920
tttccttggg ttcttgggag cagcaggaag cactatgggc gcggcgtcaa taacgctgac 1980
ggtacaggcc aggcaattat tgtctggtat agtgcagcag caaagcaatt tgctgagagc 2040
tatacaggcg cgacagcata tgttgtagct cacggtctgg ggcattaaac agctccaggc 2100
aagagtcttc gctgtggaaa gatacctaag ggatcaacag ctcttgggga tttggggctg 2160
ctctggaaaa ctcatctgca ccactaatgt gccttggaa tctagttaga gtaataaatc 2220
acagagttaa atctgggaca acatgacttg gatggaatgg gataaacaaa ttagcaatta 2280
cacagaggaa atatacaggt tgcttgaagt ctcgcaaacc cagcaggaaa agaataaaca 2340
ggacttatta gcattggaca aatgggcaag tctgtggact tggtttgaca tatcacattg 2400
gctgtggtat ataaaaatat tcataatgat agtaggaggt ttaatagggt taagaataat 2460
ttttgctgtg ctttctatag taaatagagt taggcaggga tactcacctt tgtcttttca 2520
gacccttgtc ccgaaccac ggggacccga caggcccga ggaacagaag aaggaggtgg 2580
cgagcaagac agagacagat ccgtga 2606

```

<210> 34

<211> 2657

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=90CR056; gene=rev; CDS: join(5316..5391,  
7698..7972)

<400> 34

```

atggcaggaa gaagcggagc cagcgacaca gaactcctgc aagtttgcaa gatcatcaaa 60
attctatata aaagcagtaa gtattatcat aaatgtatat attaggatta ggaataggag 120
cgctagtagt aacattttat atagccgtaa ttgtgtggac catagtatat atagaatata 180
aaaaattggg aaggcaaaag aaaatagaca ggctaattga aagaatagga gaaagagcag 240
aagacagtgg caacgagagt gatggagaca cagaggaatt atccaagctt atggagatgg 300
ggcaccttaa tcttgggtat gttgctgata tgtagtgtg cacaaaactt gtgggttaca 360
gtatattatg gggtagctgt gtggaaagag gcaaaaacca ctctattctg tgcacagat 420
gctaaggcat atgagacaga aaagcataat gtctgggcta cacatgcatg tgtaccaca 480
gacccaacc cacaagagat ggtcatggag aatgtaacag agagctttaa tatgtgggaa 540
aataacatgg tggagcagat gcatacagac ataatcagtt tatgggatca aagcttgaaa 600
ccatgtgtaa aattaacccc actctgtgtt actctaaact gtactaatgt cagaaacaat 660
accttaaca gactagcag tatggaggca ggaggggaac taacaaattg ctctttcaat 720
gtaactacag tactaagaga taagcagcag aaagtacatg cactctttta tagacttgat 780
gtagtaccaa ttgataacaa tagtactcag tataggctaa taaattgtaa tacctcagtc 840
attacacagg cttgcccaaa ggtgtccttt gaacctattc ccatacatta ttgtgctcca 900
gctggctttg cgattctaaa gtgtaacaat aaaacattca atggaacagg attatgtaca 960
aatgtcagta cagtacaatg tacacatgga attagaccag tggatatcaac tcaactgcta 1020

```

```

ttaaattggaa gcctagcaga agaacagatc ataattagaa ctaaaaatat ctcagacaat 1080
accaaaaaaca taatagtaca gcttaagaca ccagtaaaca ttacatgtac caggcctaac 1140
aataatacga gaacaagtat acatttaggg ccaggacgag cattctatgc aacaggtgac 1200
atcataggag atataagaca agcacattgt aatattagta gaacagactg gaataagact 1260
ttacaccagg tagttacaca attaggaata cacttgaaca atagaacaat aagctttaag 1320
ccaaactcag gaggggacat ggaagttaga acacatagtt ttaattgtag aggagaat 1380
ttctattgca atacatcagg gctgtttaat agtagttggg aaatgcatac taattacaca 1440
tcaaatgaca caaagggaaa cgaaaacatt aactgccat gcagaataaa acaaattgta 1500
aacatgtggc agagagtagg acgagcaatg tatgccctc ccatccaagg aaacattatg 1560
tgtgtatcaa atattacagg actaatattg acaattgacg agggtaacgc gtctgcagaa 1620
aattatacct tcagacctgg aggaggagat atgagggaca attggagaag tgaattgtat 1680
aaatataaag tagtaaaaat tgaaccactg ggaatagcac ccaccaagac aaggagaaga 1740
gtggtggaga gagaaaaaag agcagtggga atgggagctt ctttccttgg gttcttggga 1800
gcagcaggaa gcactatggg cgcggtgtca ataacgctga cggtagcagg caggcaatta 1860
ttgtctggta tagtgcagca gcaaagcaat ttgctgagag ctatacaggc gcgacagcat 1920
atgttgacgc tcacggtctg gggcattaaa cagctccagg caagagtcct cgctgtggaa 1980
agatacctaa gggatcaaca gctcctgggg atttggggct gctctggaaa actcatctgc 2040
accactaatg tgccttgaa ctctagtgg agtaataaat cacagagtga aatctgggac 2100
aacatgactt ggatggaatg ggataaacia attagcaatt acacagagga aatatacagg 2160
ttgcttgaag tctcgcaaac ccagcaggaa aagaatgaac aggacttatt agcattggac 2220
aaatgggcaa gtctgtggac ttggtttgac atatcacatt ggctgtggta tataaaaaata 2280
ttcataatga tagtaggagg tttaataggt ttaagaataa ttttgctgt gctttctata 2340
gtaaatagag ttaggcaggg atactcacct ttgtcttttc agaccctgt cccgaaccca 2400
cggggacccg acaggcccg aggaacagaa gaaggaggtg gcgagcaaga cagagacaga 2460
tccgtgagat tagtgaacgg attcttacca gttgtctggg acgacctccg gagcctgtca 2520
ctcttcagct accgcctctt gagagactta ctcttaattg tagtgaggac tgtggaactt 2580
ctggggagaa gggggagggg agccctcaa tatctctgga atcttctaca atactgggga 2640
caggaaactaa agaatag 2657

```

<210> 35

<211> 243

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=90CR056; gene=vpu

<400> 35

```

atgtatatat taggattagg aataggagcg ctagtagtaa catttatcat agccgtaatt 60
gtgtggacca tagtatatat agaataaaa aaattggtaa ggcaaaagaa aatagacagg 120
ctaattgaaa gaataggaga aagagcagaa gacagtggca acgagagtga tggagacaca 180
gaggaattat ccaagcttat ggagatgggg caccttaatc ttgggtatgt tgctgatctg 240
tag 243

```

<210> 36

<211> 2538

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=90CR056; gene=env

<400> 36

```
atggagacac agaggaatta tccaagctta tggagatggg gcaccttaat cttgggtatg 60
ttgctgatct gtagtgctgc acaaaacttg tgggttacag tatattatgg ggtacctgtg 120
tggaaagagg caaaaaccac tctattctgt gcatcagatg ctaaggcata tgagacagaa 180
aagcataatg tctgggctac acatgcatgt gtaccacag accccaaccc acaagagatg 240
gtcatggaga atgtaacaga gagctttaat atgtgggaaa ataacatggg ggagcagatg 300
catacagaca taatcagttt atgggatcaa agcttgaaac catgtgtaaa attaacccca 360
ctctgtgtta ctctaaactg tactaatgtc agaaacaata cctctaacag cactagcagt 420
atggaggcag gaggggaact aacaaattgc tctttcaatg taactacagt actaagagat 480
aagcagcaga aagtacatgc actcttttat agacttgatg tagtaccaat tgataacaat 540
agtactcagt ataggctaataaattgtaat acctcagtca ttacacaggc ttgccc aaag 600
gtgtcctttg aacctattcc catacattat tgtgtccag ctggctttgc gattctaaag 660
tgtaacaata aacattcaa tggacagga ttatgtacaa atgtcagtac agtacaatgt 720
acacatggaa ttagaccagt ggtatcaact caactgctat taaatggaag cctagcagaa 780
gaacagatca taattagaac taaaaatc tcagacaata ccaaaaacat aatagtacag 840
cttaagacac cagtaaacat tacatgtacc aggcctaaca ataatacgag aacaagtata 900
catttagggc caggacgagc attctatgca acaggtgaca tcataggaga tataagacaa 960
gcacattgta atattagtag aacagactgg aataagactt tacaccaggc agttacacaa 1020
ttaggaatac acttgaacaa tagaacaata agctttaagc caaactcagg aggggacatg 1080
gaagttagaa cacatagttt taattgtaga ggagaatttt tctattgcaa tacatcaggg 1140
ctgtttaata gtagttggga aatgcatact aattacacat caaatgacac aaagggaaac 1200
gaaaacatta cactgccatg cagaataaaa caaattgtaa acatgtggca gagagtagga 1260
cgagcaatgt atgcccctcc catccaagga aacattatgt gtgtatcaaa tattacagga 1320
ctaattattga caattgacga gggtaacgag tctgcagaaa attatacctt cagacctgga 1380
ggaggagata tgagggacaa ttggagaagt gaattgtata aatataaagt agtaaaaatt 1440
gaaccactgg gaatagcacc caccaagaca aggagaagag tgggtggagag agaaaaaaga 1500
gcagtgggaa tgggagcttc tttccttggg ttcttgggag cagcaggaag cactatgggc 1560
gcggcgtcaa taacgctgac ggtacaggcc aggc aattat tgtctggtat agtgcagcag 1620
caaagcaatt tgctgagagc tatacaggcg cgacagcata tgttgagct cacggctctg 1680
ggcattaaac agctccaggc aagagtcctc gctgtggaaa gatacctaag ggatcaacag 1740
ctcctgggga tttggggctg ctctggaaaa ctcatctgca ccactaatgt gccttggaac 1800
tctagttgga gtaataaatc acagagtga atctgggaca acatgacttg gatggaatg 1860
gataaacaata tagcaatta cacagaggaa atatacagg tgcttgaagt ctcgcaaac 1920
cagcaggaata agaataaaca ggacttatta gcattggaca aatgggcaag tctgtggact 1980
tggtttgaca tatcacattg gctgtggtat ataaaaatat tcataatgat agtaggaggt 2040
ttaataggtt taagaataat ttttgctgtg ctttctatag taaatagagt taggcaggga 2100
tactcacctt tgtcttttca gaccttgtc ccgaaccac ggggacccga caggcccgaa 2160
ggaacagaag aaggaggtgg cgagcaagac agagacagat ccgtgagatt agtgaacgga 2220
ttcttaccag ttgtctggga cgacctccgg agcctgtcac tcttcagcta ccgcctcttg 2280
agagacttac tcttaattgt agtgaggact gtggaacttc tggggagaag ggggagggaa 2340
gccctcaaat atctctggaa tcttctacaa tactggggac aggaactaaa gaatagtgt 2400
attgatttgc ttaacaccac agcaatagca gttagctgagg gaacagatgg gattatagta 2460
atagtgcaaa gagcttgagg agctattctc cacataccta gaagaataag acagggcttt 2520
gaaagaagct tgctataa 2538
```

<210> 37  
 <211> 621  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

<220>  
 <223> isolate=90CR056; gene=nef

<400> 37  
 atggggaggca aatgggtcaaa aagtaggatg ggtgggtggt ctactataag ggaaagaatg 60  
 aggcgagctg aaccagtagc agaaggggta ggagcagtgt ctcgagattt ggatagacgc 120  
 ggggcagtca caattaataa tacagcatct actaatcgtg atgccgcctg gctggaagca 180  
 caagaggacg gggaggaagt aggcctttcca gtcaggcctc aggtaccttt aagaccaatg 240  
 acctataagg gagcttttga tctcagccat tttttaaaag aaaagggggg actggatggg 300  
 ttaatttact ccaagcaaag acaggacatc cttgatttat gggctctataa cacacaaggc 360  
 tacttccctg actggcagaa ctacacacca gggccagggg agagatttcc cctgaccttt 420  
 gggtggtgct tcaagctagt accagtaaat ccacaggagg tagaacaggc caatgaagga 480  
 gagaacaaca gcttgctaca ccccatgagc ctgcatggaa tggaggatga cgggagagaa 540  
 gtgctgatgt ggaaatttga cagtcgacta gcattgacac acttggcccg agtaaagcat 600  
 ccggagtaca aagactgctg a 621

<210> 38  
 <211> 1486  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

<220>  
 <223> isolate=92RW009; gene=gag

<400> 38  
 atgggtgcga gagcgtcaat attaaaggc ggaaaattag atgcctggga aaaaattaag 60  
 ttaaagccag gggggaaaga aaacatatat gatgaaacac ctagtatggg caagcagggga 120  
 gctggaaaga tttgcactta accctgacct tttagagaca ccagaaggct gtaaacaaat 180  
 aatgagacag ctgcaaccag ctcttcagac aggaacagat gaacttaggt cattatataa 240  
 tacagtagca accctctatt gtgtacatca aaagatagat gtaaaagaca ccaaggaggc 300  
 cttagacaag atagaggaag aacaaaacaa aagtcagcaa aaaacacagc aggcagaagc 360  
 agctgacaaa ggaaaagtca gtcaaaatta ccctatagtg caaaatgcac aagggcaaat 420  
 ggtacaccag gccatatcac ctagaacttt gaatgcgtgg gtaaaagtaa tagaggagaa 480  
 ggcttttagc caagaggtaa taccatggtt tacagcatta tcagaaggag ccacccaca 540  
 agatttaaac accatgctaa atacagtggg gggacatcaa gcagccatgc aaatgctaaa 600  
 agatacaatc aatgaggagg ctgcagagtg ggatagggtg catccagtgc aggcagggcc 660  
 tgttgcgcca ggccagataa gagaaccaag gggaagtgac atagcaggaa ctactagtac 720  
 ccttcaggaa caaatagcat ggatgacaaa taaccacact attccagtgg gagaaattta 780  
 taaaagatgg ataattctgg ggttaataa aatagtaaga atgtatagcc ctgtcagcat 840  
 attggacata aaacaagggc caaaggaacc ttttagagac tatgtagacc gggtctttaa 900  
 aaccttaaga gccgaacaag cttcacaaga tgtaaaaaat tggatgacag ataccttggt 960  
 agtccaaaat gcgaaccag attgtaagac cattttaaga gcattagggc caggggcttc 1020



```

attagaagaa atgatgacag catgccaggg agtgggagga cccggccata aagcaagggt 1080
tttggctgaa gcaatgagcc aagtacaaca accaaacata atgatgcaga gaggcaat 1140
taagggccag agaagaatta ttaagtgttt caactgtggc aaagaaggac acctagccag 1200
aaattgcagg gccctagaa aaaagggctg ttggaaatgt ggaaaggagg gacaccaa 1260
gaaagactgc actgagagac aggctaattt tttagggaaa atttggcctt ccaacaagg 1320
gaggccagga aattttcccc agagcagact ggagccaaca gcccaccag cagagaact 1380
tggaatgggg gaagagatag cctctcctct gaaacaggag cagaaagaca gggaacct 1440
aatttcctc aaatcactct ttggcaacga cccctgtca cagtaa 1486

```

<210> 39

<211> 579

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92RW009; gene=vif

<400> 39

```

atggaaaaca gatggcaggt gatgattgtg tggcaggtag acaggatgaa gattagaaca 60
tggaatagtc tagtaaagca ccatatgtat gcttcaagga gagctaagg atggttttat 120
agacatcatt atgaaagcag acatccaaaa ataagttcag aagtacacat cccattagg 180
gaagctagat tagtaataaa aacatattgg ggtttgcaa caggggaaag agattggcat 240
ttgggtcatg gagtctccat agaatggaga ttgagaagat ataagacaca agtagacc 300
ggcctggcag gccaaactaat ccatatgcat tattttgatt gttttgcaga ctctgcc 360
aggaaagcca tattaggaca tatagttagc cctaggtgtg actatcaagc aggacata 420
aaggtaggat ctctacaata cttggcactg acagcattga taaaaccaa aaagataa 480
ccacctctgc ctagtgtag taaattagta gaggataaat ggaacaagcc ccagaagac 540
aggggccgca gagggaacca tacaatgaat ggacactag 579

```

<210> 40

<211> 291

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92RW009; gene=vpr

<400> 40

```

atggaacaag cccagaaga ccaggggccg cagagggaa catacaatga atggacact 60
gagcttttag aggcactcaa gcaggaagct gtcagacact ttcctagacc atggctcc 120
gacttaggac aatatatcta tgaaacctat ggggatactt ggaggggagt agaagcta 180
ataagaattc tgcaacaact actgtttatc catttcagaa ttgggtgccg gcatagcag 240
ataggcattt tgcaacagag aagagcaaga aatggagcca gtagatccta a 291

```

<210> 41

<211> 2640

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92RW009; gene=tat

<400> 41

```
atggagccag tagatcctaa actagagccc tggaaaccatc caggaagtca gcctaaaact 60
gcctgtaata actgttattg taaacactgt agctatcatt gtctagtttg cttccaggca 120
aaaggcttag gcatttccta tggcaggaag aagcggagac agcgacgaaa cgctcctcca 180
agcagtgaag atcatcaaaa tcctatatca aagcagtaag tagtaataaa cagtatatgt 240
aatgacttct ttagaaatct atgcaatagt agcactgata gtggcgctaa tcatagtgat 300
agttgtgtgg acttttagcag gtatagaata taagaaattg ctaaagcaaa ggaaaataga 360
taggttaatt aagaaaataa gagaaagagc agaagatagt ggcaatgaga gtgatgggga 420
cattgatgaa ttatcaaaac ttgtgggggt ggggaactat gatcttgggg atgttaacaa 480
tttgtagtgc tgcaaacaac ttgtgggtta ctgtctacta tggggtacct gtgtggaaag 540
acgcagagac caccttattt tgtgcatcag atgctaaagc atatgatcca gaaaagcata 600
atgtctgggc tacacatgcc tgtgtaccca tagaccccg cccacaagaa atacatttgg 660
aaaatgtgac agaagagttt aacatgtgga aaaataacat ggtagagcag atgcatacag 720
atataatcag tctatgggac caaagcctaa agccatgtgt aaagttaacc cctctctgcy 780
ttactttaga gtgtaacaac atcaccaatg tcaacaacac tgtcaacatt acggatgaca 840
tgaaaggaga aataaaaaac tgctctttca atatgaccac agaattaagg gataagaaac 900
agagagtgtg ttcacttttt tataggcttg atatagtaca aattaatagc aatagtaata 960
acagtagtca taatcagtat aggttaataa attgtaatac ctcagccatt acacaggctt 1020
gtccaaaggt atccttttgag ccaattccca taaattattg tgccccagct ggttttcgca 1080
ttctaaagtg taaagataaa aagttcaatg gaacagggcc atgcaagaat gtcagcacag 1140
tacaatgcac acatggaatc aagccagtag tatcaactca gctgctgtta aatggcagtc 1200
tagcagaaga agagataata attagatctg aaaatattac aaacaatgcc aaaaccataa 1260
tagtacaact taacgagact gtacaaatta attgttccag acctaacaac aatacaagaa 1320
aaagtgtaca tataggacca ggacaagcat tttatgcaac aggtgacgta ataggggata 1380
taagacaagc atattgtact gtcaatggaa caaaatggaa tagaacttta caaaaggtag 1440
cagaaaaatt aagtcactac tttgagaaca ttacaacaat aatttttaag aactcctcag 1500
gggggggatt agaaattaca acacatagtt ttaattgtgg aggagaattt ttctattgta 1560
atacatcagg cttgttttaat agcacctgga gtaaaagaaa tggcacctgg cagtcaaatg 1620
gcacagaatt aatatataca ctcccatgca gaataaagca aattataaat atgtggcaga 1680
ggacaggaca agcaatgtat gccctccca tccaaggagt aataagctgt gtatcaaca 1740
ttacaggact actattaaca agagatggtg gaaataataa tactacaact gaaaccttca 1800
gacctggagg aggagatatg agggataatt ggagaagtga actatataaa tataaagtag 1860
taaaaattga accactagga gtagcaccca ccagggcaaa gaggagagtg gtggagagag 1920
aaaaaagagc agttggactg ggagctgtct tcattgggtt cttaggagca gcaggaagca 1980
ctatgggcgc ggcgtcaata acgctgacgg tacaggccag acaattattg tctggcatag 2040
tgcaacagca aagcaatttg ctgagggcta tagaggctca acagcatcta ttaaaactca 2100
cagtctgggg cattaaacag ctccaggcaa gagtctggc tctggaaaga tacctaaggg 2160
atcaacagct cctaggaatt tggggctgct ctggaaaact catctgcacc actaatgtgc 2220
cctggaactc tagttggagt aataagactc agcaggaaat atgggataac atgacctggc 2280
agcaatggga taaagaaatt ggcaattaca cacaaataat atatagtcta attgaagaat 2340
cgcagaacca gcaggaaaag aatgaacaag acttattggc attggacaag tgggcaaatc 2400
tgtggaattg gtttgacata tcaaattggc tgtggtatat aaaaatattc ataatgatag 2460
taggaggctt aataggttta agaataattt ttgctgtgct ctctatagtg aacagagtta 2520
ggcagggata ctcaccatta tcgtttcaga cccttatccc aaacccgagg ggacccgaca 2580
```

ggctcggagg aatcgaagaa gaaggtggag agcaagacag aggcagatcc attcgattag 2640

<210> 42

<211> 2658

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92RW009; gene=rev

<400> 42

```
atggcaggaa gaagcggaga cagcgacgaa acgctcctcc aagcagtgaa gatcatcaaa 60
atcctatatc aaagcagtaa gtagtaataa acagtatatg taatgacttc tttagaaatc 120
tatgcaatag tagcactgat agtggcgcta atcatagtga tagttgtgtg gacttttagca 180
ggtatagaat ataagaaatt gctaaagcaa aggaaaatag ataggttaat taagaaaata 240
agagaaagag cagaagatag tggcaatgag agtgatgggg acattgatga attatcaaaa 300
cttgtggggg tggggaacta tgatcttggg gatgttaaca atttgtagtg ctgcaaaca 360
cttgtgggtt actgtctact atgggggtacc tgtgtggaaa gacgcagaga ccaccttatt 420
ttgtgcatca gatgctaaag catatgatcc agaaaagcat aatgtctggg ctacacatgc 480
ctgtgtaccc atagaccccg acccacaaga aatacatttg gaaaatgtga cagaagagtt 540
taacatgtgg aaaaataaca tggtagagca gatgcataca gatataatca gtctatggga 600
ccaaagccta aagccatgtg taaagttaac ccctctctgc gttacttttag agtgtaacaa 660
catcaccaat gtcaacaaca ctgtcaacat tacggatgac atgaaaggag aaataaaaaa 720
ctgctctttc aatatgacca cagaattaag ggataagaaa cagagagtgt attcactttt 780
ttataggctt gatatagtac aaattaatag caatagtaat aacagtagtc ataatacagta 840
taggttaata aattgtaata cctcagccat tacacaggct tgtccaaagg tatcctttga 900
gccaattccc ataaattatt gtgccccagc tgggttcgcg attctaaagt gtaaagataa 960
aaagttcaat ggaacagggc catgcaagaa tgtcagcaca gtacaatgca cacatggaat 1020
caagccagta gtatcaactc agctgctgtt aaatggcagt ctagcagaag aagagataat 1080
aattagatct gaaaatatta caaacaatgc caaaaccata atagtacaac ttaacgagac 1140
tgtacaaatt aattgttcca gacctaacaa caatacaaga aaaagtgtac atataggacc 1200
aggacaagca ttttatgcaa caggtgacgt aataggggat ataagacaag catattgtac 1260
tgtcaatgga acaaaatgga atagaacttt acaaaaggta gcagaaaaat taagtcacta 1320
ctttgagaac attacaacaa taatttttta gaactcctca gggggggatt tagaaattac 1380
aacacatagt ttaattgtg gaggagaatt tttctattgt aatacatcag gcttgtttaa 1440
tagcacctgg agtaaaagaa atggcacctg gcagtcaaat ggcacagaat taaatataac 1500
actcccatgc agaataaagc aaattataaa tatgtggcag aggacaggac aagcaatgta 1560
tgccctccc atccaaggag taataagctg tgtatcaaac attacaggac tactattaac 1620
aagagatggt ggaaataata atactacaac tgaaccttc agacctggag gaggagatat 1680
gagggataat tggagaagtg aactatataa atataaagta gtaaaaattg aaccactagg 1740
agtagcacc accagggcaa agaggagagt ggtggagaga gaaaaaagag cagttggact 1800
gggagctgtc ttcattgggt tcttaggagc agcaggaagc actatgggcg cggcgtcaat 1860
aacgtgacg gtacaggcca gacaattatt gtctggcata gtgcaacagc aaagcaattt 1920
gctgagggct atagaggtc aacagcatct attaaaactc acagtctggg gcattaaaca 1980
gctccaggca agagtccctg ctctggaaag atacctaagg gatcaacagc tcctaggaat 2040
ttggggctgc tctgaaaac tcatctgcac cactaatgtg ccctggaact ctagttggag 2100
taataagact cagcaggaaa tatgggataa catgacctgg cagcaatggg ataaagaaat 2160
tggcaattac acacaaataa tatatagtct aattgaagaa tcgcagaacc agcaggaaaa 2220
```

```

gaatgaacaa gacttattgg cattggacaa gtgggcaaat ctgtggaatt ggtttgacat 2280
atcaaattgg ctgtggtata taaaaatatt cataatgata gtaggaggct taatagggtt 2340
aagaataatt tttgctgtgc tctctatagt gaacagagtt aggcagggat actcaccatt 2400
atcgtttcag acccttatcc caaacccgag gggacccgac aggctcggag gaatcgaaga 2460
agaagggtgga gagcaagaca gaggcagatc cattcgatta gtgagcggat tcttagcact 2520
tgccctgggac gacctacgga gcctgtgcct ttccagctac caccgattga gagacttact 2580
attgattgca gcgaggacgg tggaacttct gggacgcagc agtctcaggg gactacagag 2640
ggggtgggaa acccttaa                                     2658

```

<210> 43

<211> 246

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92RW009; gene=vpu

<400> 43

```

atgacttctt tagaaatcta tgcaatagta gcactgatag tggcgctaata catagtgata 60
gttgtgtgga ctttagcagg tatagaatat aagaaattgc taaagcaaag gaaaatagat 120
aggttaatta agaaaataag agaaagagca gaagatagtg gcaatgagag tgatggggac 180
attgatgaat tatcaaaact tgtgggggtg gggaactatg atcttgggga tgtaacaat 240
ttgtag                                     246

```

<210> 44

<211> 2583

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92RW009; gene=env

<400> 44

```

atgagagtga tggggacatt gatgaattat caaaacttgt ggggggtggg aactatgatc 60
ttggggatgt taacaatttg tagtgctgca aacaacttgt gggttactgt ctactatggg 120
gtacctgtgt ggaaagacgc agagaccacc ttattttgtg catcagatgc taaagcatat 180
gatccagaaa agcataatgt ctgggctaca catgcctgtg taccataga ccccgaccca 240
caagaaatac atttggaaaa tgtgacagaa gagtttaaca tgtggaaaaa taacatggta 300
gagcagatgc atacagatat aatcagtcta tgggaccaa gcctaaagcc atgtgtaaag 360
ttaaccctc tctgcgttac tttagagtgt aacaacatca ccaatgtcaa caacactgtc 420
aacattacgg atgacatgaa aggagaaata aaaaactgct ctttcaatat gaccacagaa 480
ttaagggata agaaacagag agtgatttca cttttttata ggcttgatat agtacaaatt 540
aatagcaata gtaataacag tagtcataat cagtataggt taataaattg taatacctca 600
gccattacac aggcttgtcc aaaggatatcc tttgagccaa ttcccataaa ttattgtgcc 660
ccagctggtt tcgcgattct aaagtgtaaa gataaaaagt tcaatggaac agggccatgc 720
aagaatgtca gcacagtaca atgcacacat ggaatcaagc cagtagtata aactcagctg 780
ctgttaaatg gcagtctagc agaagaagag ataataatta gatctgaaaa tattacaaac 840
aatgccaaaa ccataatagt acaacttaac gagactgtac aaattaattg ttccagacct 900

```

```

aacaacaata caagaaaaag tgtacatata ggaccaggac aagcatttta tgcaacaggt 960
gacgtaatag gggatataag acaagcatat tgtactgtca atggaacaaa atggaataga 1020
actttacaaa aggtagcaga aaaattaagt cactactttg agaacattac aacaataatt 1080
tttaagaact cctcaggggg ggatttagaa attacaacac atagttttaa ttgtggagga 1140
gaatttttct attgtaatac atcaggcttg ttaatagca cctggagtaa aagaaatggc 1200
acctggcagt caaatggcac agaattaaat ataacactcc catgcagaat aaagcaaatt 1260
ataaatatgt ggcagaggac aggacaagca atgtatgccc ctcccatcca aggagtaata 1320
agctgtgtat caaacattac aggactacta ttaacaagag atggtggaaa taataatact 1380
acaactgaaa ccttcagacc tggaggagga gatatgaggg ataattggag aagtgaacta 1440
tataaatata aagtagtaaa aattgaacca ctaggagtag caccacaccag ggcaaagagg 1500
agagtgggtg agagagaaaa aagagcagtt ggactgggag ctgtcttcat tgggttctta 1560
ggagcagcag gaagcactat gggcgcgggc tcaataacgc tgacggtaca ggccagacaa 1620
ttattgtctg gcatagtgc aacagaaagc aatttgctga gggctataga ggctcaacag 1680
catctattaa aactcacagt ctggggcatt aaacagctcc aggcaagagt cctggctctg 1740
gaaagatacc taagggatca acagctccta ggaatttggg gctgctctgg aaaactcatc 1800
tgcaccacta atgtgccctg gaactctagt tggagtaata agactcagca ggaaatatgg 1860
gataacatga cctggcagca atgggataaa gaaattggca attacacaca aataatatat 1920
agtctaattg aagaatcgca gaaccagcag gaaaagaatg aacaagactt attggcattg 1980
gacaagtggg caaatctgtg gaattggttt gacatatcaa attggctgtg gtatataaaa 2040
atattcataa tgatagtagg aggcctaata ggtttaagaa taatttttgc tgtgctctct 2100
atagtgaaca gagttaggca gggatactca ccattatcgt ttcagaccct tatcccaaac 2160
ccgaggggac ccgacaggct cggaggaatc gaagaagaag gtggagagca agacagaggc 2220
agatccattc gatttagtgag cggattctta gcacttgctt gggacgacct acggagcctg 2280
tgctttttca gctaccaccg attgagagac ttactattga ttgcagcgag gacggtggaa 2340
cttctgggac gcagcagctc caggggacta cagagggggt gggaaaccct taagtatcta 2400
ggaaatcttg tgcagtattg gggctctggaa ctaaaaagga gtgctattaa tctgcttgat 2460
accacagcaa tagtagtagc tgaaggaaca gataggatta tagaattaat acaaagaatt 2520
agcagagcta tctataacat acctagcaga ataagacagg gctttgaagc agctttgcaa 2580
taa

```

<210> 45

<211> 624

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92RW009; gene=nef

<400> 45

```

atgggaagca agtgggtcaaa atgtagtcca gtaggatggc ctgctgtaag agaaagacta 60
aggcaactg agccagcagc agagggagta ggagcagcgt ctcaagacct agacaaatat 120
ggggcactta caagtagcaa cacaccagc aacaatgctg attgtgcctg gctggcagca 180
caagaggagg aaaacgaagt aggcctttcca gtcagacctc aggtgccttt aagaccaatg 240
acttataaag cagcagttga tctcagcttc tttttaaaag aaaagggggg actggaaggg 300
ttaatttact ctaagaaaag gcaagacatc ctggatttgt gggctctataa cacacaaggc 360
tacttcctg attggcaaaa ctacacacca ggaccagggg tcagatatcc actgactttt 420
ggatggtgtt acaagctagt gccagttgac ccaagggaag tggaagaagc caatgaagga 480
gaggacaact gcttactaca ccctctgagc cagcatggaa tggaggatga ggacagagaa 540

```

gtcttaaagt ggaagtttga cagtcaccta gcacacagac acatggcccg cgagctacat 600  
 ccggagtatt ataaagactg ctga 624

<210> 46

<211> 8

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92RW009; standard name=3' LTR repeat  
 region; note=3' R repeat should end one base  
 beyond end of this

<400> 46

aaaaaaaa

8

<210> 47

<211> 1494

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG003; gene=gag

<400> 47

atgggtgcga gagcgtcagt attaagcggg ggaaaattag atgcatggga aaaaattcgg 60  
 ttgaggccag ggggaaagaa aaaatataga atgaaacatt tagtatgggc aagcagggaa 120  
 ctggagagat ttgcacttaa ccctgacctc ttagaaacaa cagaagggtg tcagcaaata 180  
 atgagacagc tgcaaccatc tctccagaca ggaacagagg agattaaatc attatttaat 240  
 acagtagcaa ccctctattg tgtacatcaa aggatagagg taaaagacac caaagaagct 300  
 ctagaggaag tggaaaaaat acaaaagaac agtcagcaag aaacacagaa ggcagcaatg 360  
 ggtaaaggaa acagcagcca agttagccaa aattatccta tagtgcagaa tgcacaaggg 420  
 caagtggtag accagcccat atcacctagg actttaaatg catgggtaaa agtaatagaa 480  
 gaaaagaact tcagtccaga agtaataccc atgtttacag cattatcaga aggagccacc 540  
 ccacaagatt tgaataccat gctaaacacc gtgggggggc atcaagcagc tatgcaaag 600  
 ctaaaagatt ctattaatga agaagctgca gagtgggata ggctacatcc acaacaggca 660  
 ggacctattc caccaggcca gataagagaa ccaaggggaa gtgatatagc aggaactact 720  
 agtaccctgc aggaacaaat aacatggatg accagcaacc cacctatccc agtgggagaa 780  
 atttataaaa gatggataat tctgggggta aataaaatag tgagaatgta tagccctgtc 840  
 agtattttag acataaaaca agggccaaaa gaacccttca gagattatgt ggatagggtc 900  
 tttaaaactt tgagagctga gcaagccaca caggaggtaa aaaactggat gacagacacc 960  
 ttgttgggtc aaaatgcgaa ccagattgt aagaccatcc taagagcatt aggagcagga 1020  
 gctacactag aagaaatggt gacagcatgt caaggagtgg gaggaccag ccacaaagca 1080  
 agagttttag ctgaggcaat gagccgggca acaggtacat cagcagccat aatgatgcag 1140  
 aaaaacaatt ttaagggccc gagaagaggt attaatgtgt tcaactgtgg caaggaagga 1200  
 catctagcca gaaattgcag ggcccctagg aaaaaaggct gttggaaatg tggaaaggag 1260  
 ggacatcaaa tgaaagactg cacagagaga caggctaatt ttttagggaa aatttggcct 1320  
 tccaacaagg ggaggccagg gaattttctt cagaacaggc cagagccaac agccccacc 1380

gcagagagct tcgggttcgg agaggagata gccccttccc tgaagcagga gccgagggaa 1440  
aaggaatcac ctccattaac ctccctcaaa tcactctttg gcaacgaccc ctag 1494

<210> 48

<211> 4307

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG003; gene=gag-pol fusion

<400> 48

atgggtgcga gagcgtcagt attaagcggg ggaaaattag atgcatggga aaaaattcgg 60  
ttgaggccag ggggaaagaa aaaatataga atgaaacatt tagtatgggc aagcagggaa 120  
ctggagagat ttgcacttaa ccctgacctc ttagaaacaa cagaaggttg tcagcaaata 180  
atgagacagc tgcaaccatc tctccagaca ggaacagagg agattaaatc attatttaat 240  
acagtagcaa ccctctattg tgtacatcaa aggatagagg taaaagacac caaagaagct 300  
ctagaggaag tggaaaaaat acaaaagaac agtcagcaag aaacacagaa ggcagcaatg 360  
ggtaaaggaa acagcagcca agttagccaa aattatccta tagtgcagaa tgcacaaggg 420  
caagtggtag accagcccat atcacctagg actttaaatg catgggtaaa agtaatagaa 480  
gaaaagaact tcagtccaga agtaataccc atgtttacag cattatcaga aggagccacc 540  
ccacaagatt tgaataccat gctaaacacc gtgggggggc atcaagcagc tatgcaaagt 600  
ctaaaagatt ctattaatga agaagctgca gagtgggata ggctacatcc acaacaggca 660  
ggacctattc caccaggcca gataagagaa ccaaggggaa gtgatatagc aggaactact 720  
agtaccctgc aggaacaaat aacatggatg accagcaacc cacctatccc agtgggagaa 780  
atttataaaa gatggataat tctgggggta aataaaatag tgagaatgta tagccctgtc 840  
agtatttttag acataaaaca agggccaaaa gaacccttca gagattatgt ggatagggtc 900  
tttaaaactt tgagagctga gcaagccaca caggaggtaa aaaactggat gacagacacc 960  
ttgttggtcc aaaatgcgaa ccagattgt aagaccatcc taagagcatt aggagcagga 1020  
gctacactag aagaaatgtt gacagcatgt caaggagtgg gaggaccag ccacaaagca 1080  
agagtttttag ctgaggcaat gagccgggca acaggtagat cagcagccat aatgatgcag 1140  
aaaaacaatt ttaagggccg gagaagaggt attaagtgtt tcaactgttg caaggaagga 1200  
catctagcca gaaattgcag ggcccctagg aaaaaaggct gttggaaatg tggaaaggag 1260  
ggacatcaaa tgaaagactg cacagagaga caggctaatt ttttagggaa aatttggcct 1320  
tccaacaagg ggaggccagg gaattttctt cagaacaggc cagagccaac agccccaccc 1380  
gcagagagct tcgggttcgg agaggagata gccccttccc tgaagcagga gccgagggaa 1440  
aaggaatcac ctccattaac ctccctcaaa tcactctttg gcaacgaccc ctagtccacag 1500  
taagaatagg gggacagcta atagaagctc tattagacac aggagcagat gatacagtat 1560  
tagaacaagt aaattttacca ggaaaatgga aaccaaaaat gataggggga attggaggat 1620  
ttatcaaagt aaaacagtat gatcaaatac ttatagaaat tgaagggaaa aaggctatag 1680  
ggacagtact agtaggacct acacctatca acataattgg gagaaatatg ttgactcaaa 1740  
ttggttgtag tttaaatttt ccaattagtc ctattgagac tgtaccagta aaattaaaaac 1800  
caggaataga tggcccaaag gttaaacaat ggccattgac agaagagaaa ataaaagcat 1860  
taacagaaat ttgtacagat atggaaaagg aaggaaaaat ttcaaaaatt gggccagaaa 1920  
atccatacaa cactccaata tttgccataa agaaaaaaga cagtactaaa tggagaaagt 1980  
tggtagattt cagagagctc aataaaagaa ctcaagactt ctgggaggtc caattaggca 2040  
tacctcatcc cgcgggggta aaaaagaaaa gatcagtaac agtactagat gtgggggatg 2100  
catatttttc aattccccta gatgaaaact ttagaaagta tacagcattc actataccta 2160

```

gtataaataa tgagacacca gggattagat atcagtacaa tgtgcttccg caaggatgga 2220
aaggatcacc agcaatatatt cagagtagca tgacaaaaat cttagaaccc tttagaacag 2280
aaaatccaga aatagtgate tatcagtaca tggatgattt atatgtagga tctgacttag 2340
aaacagggca gcatagagca aaaatagagg aattaagaaa tcatctactg agatggggat 2400
ttaccacacc agataaaaaa catcagaaag aacctccatt tctctggatg ggatatgagc 2460
tccatcctga caaatggacg gtacaaccta tacagctgcc aaacaaagaa agctggactg 2520
tcaatgatat acaaaaatta gtgggaaaac taaattgggc aagtcagatt tatccaggga 2580
ttaaagtaaa gcaactatgt aaactcctta ggggggcca agcactaaca gacatagtag 2640
cactgactga agaagcagaa ttagaattgg cagagaacag ggaaattcta aaagaacctg 2700
tacatggagt ctactatgac ccatcaaaag aattaatagc agaattacag aaacaagggt 2760
gcgaccaatg gacatatcaa atttatcaag agccatacaa aaatctgaaa acaggaaagt 2820
atgcaaaaag ggggtctgcc cacactaatg atgtaaaaca gttaacagaa gcagtgc aaa 2880
aaatagccac agagagcata gtaatatggg gaaaagttcc taaatttaaa ctacctataa 2940
ggaaagaaac atgggaagta tgggtggacag aatattggca ggccacctgg attcctgatt 3000
gggagtttgt caataccctt cctctagtaa agttatggta tcgattagaa acagaaccca 3060
taccaggagc agaaacttac tatgtagatg gggcagctaa taaagaaaca aaattaggaa 3120
aggcaggata tgttactgac agaggaaaac aaaaaattat caccatacag gaaacaacaa 3180
atcaaaaaac tgaattacac gcaattcagc tagctttgca ggattcagga tcagaagtaa 3240
acatagtaac agactcacag tatgcattag gaatcattca agcacaacca gataggagt 3300
aatcagaatt agtcaatcaa ataatagaac agctaataaa aaaggaaaag gtctacttaa 3360
catgggtacc agcacacaaa ggaattgggg gaaatgaaca agtagataaa ttagtcagta 3420
gtggaatcag aaaagtactg tttttagatg gcatagacaa agctcaagag gaccatgaaa 3480
gatatcacag caattggaga gcaatggcta gtgattttta tctgccacct atagtagcaa 3540
aagaaatagt ggccagctgt gataaatgtc agctaaaagg ggaagccatg catggacaag 3600
tagactgtag tccaggaata tggcaattag attgcacaca tctagaagga aaagtcatta 3660
tagtagcagt ccatgtagcc agtggctata tagaagcaga agttatccca gcagaaacag 3720
gacaggagac agcatacttc ctgctaaaat tagcaggaag atggccagta aaagtaatac 3780
acacagacaa tggcagcaat ttcaccagtg ctgcaatgaa agcagcctgt tgggtgggcaa 3840
atatccaaca ggaatttgga attccctaca atcccaaag ccaaggagta gtggaatcta 3900
tgaataaaga attaaagaaa attatagggc aggtcaggga tcaagctgaa cacctcaaga 3960
cagcagtaca gatggcagta ttcattcaca attttaaaag aaaagggggg attgggggggt 4020
acagtgcagg ggaaagaata atagacataa tagcatcaga tatacaaact aaagaactac 4080
aaaaacagat tataaaaatt caaaattttc ggggtctatta caggacagc agagacccca 4140
tttggaagg accagcaaaa ctactctgga aagggtgaagg ggcagtagta atacaggaca 4200
atagtgagat aaaggtagta ccaagaagaa aagtaaaaat cattaaggat tatggaaaac 4260
agatggcagg tgggtgattgt gtggcaggta gacaggatga ggattag 4307

```

<210> 49

<211> 579

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG003; gene=vif

<400> 49

```

atggaaaaca gatggcagggt ggtgattgtg tggcaggtag acaggatgag gattagaaca 60
tggaacagtt tagtaaaata tcatatgtat aaatctaaga aagctaagga ttgggtttat 120

```



```

agacatcact atgaaagtag gcatccaaaa gtaagttcag aagtacacat cccactaggg 180
gaggctagat tagtagtaag aacatattgg ggtctgcata caggagaaag agactggcac 240
ttgggtcagg ggtctccat agaatggaag cagagaagat atagcacaca aatagatcct 300
gacctagcag accaactgat tcacctgcat ttttttaact gtttttcaga atcggccgta 360
aggaaagcca tactaggaga agtagttaga cctagggtgtg aatatcaaac aggacataat 420
caggtaggat cactacaata tttagcactc aaagcattag taacaccaac acagacaaag 480
ccacctttac ctagtgtaa gaagttaaca gaagatagat ggaacgagcc ccagaagacc 540
aggggccaca gagggagcca ttcaacgaat ggacactag 579

```

<210> 50

<211> 114

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG003; gene=vpr

<400> 50

```

atggaacgag cccagaaga ccaggggcca cagagggagc cattcaacga atggacacta 60
gaactgttag aagaacttaa acatgaagct gtagacatg gcttcattgga ttag 114

```

<210> 51

<211> 2578

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG003; gene=tat

<400> 51

```

atggagctgg tagatcctag cctagagccc tggaaccacc caggaagtca gcctacaact 60
gcttgtaaca aatgttactg taaaatatgc tgctggcatt gccattgtg ctttctgaac 120
aagggttag gcatctccta tggcaggaag aagcggagac gccgacgagg aactcctcag 180
agtcaccagg atcatcaaaa tcctgtacca aagcagttag tagtaatagt tagtatatgt 240
gatgcaatcc ttagaaatag ctgcaatagc aggactagta gtagcagcca tagcagccat 300
agttgtgtgg accatagaaa aataaagaaa caggagaaaa tagacagggtt acttgataga 360
ataagagaaa gagcagaaga tagtggcaat gagagtgaag gggacacaga ggaattggca 420
acacttgtgg acatggtgga ctttgatcct tgggttgggtg ataatttgta gtgcctcaaa 480
taacttgtgg gtcacagtct attatggggt accagtgtgg gaagacgcag ataccctct 540
atthttgtgca tctgatgcta aagcatatag tactgaaaga cataatgtct gggccacaca 600
tgctgtgta cccacagacc ccaaccaca agagataact ctggaaaatg taacagaaac 660
ttttaacatg tggaaaaata acatggtaga acagatgcat gaggatataa tcagtttatg 720
ggatgaaagc ctaaagccat gtgtaaagct aaccctctc tgtgttacct taaactgtac 780
taatgtcaat tgtaacagta atgtgaccag cactgggaac agtgctggga ccaacgctac 840
gtgtaacata gaagaagcaa acaacttaa aaactgctct ttcaatataa ccacagaaat 900
aagagataag aaaaagacag aatatgcgct tttctataga cttgatgtgg taccaatcga 960
tggtataaat aatgtctcaa ataactatag gctaataaat tgtaatgtct caaccattaa 1020
acaagcttgt ccaaagggtg cttttgacct acttcccata cattattgtg ctccagctgg 1080

```

```

gtttgcgatt ttaaagtgtg ggggtaagaa tttcactgga acaggacaat gtaaaaatgt 1140
cagttcagta caatgtacac atggaattaa accagtggta tcaactcaat tactactaaa 1200
tggtagtcta gcagaaggag aaatagtaat tagatctgaa aacctcacag acaatgccaa 1260
agtcataata gtacagctta ataaaaactat aggaattaat tgtaccagac ccaacaacaa 1320
tacaagaaaa agtataagaa tcggacctgg acaagcgttc tatgcaacag gtgaaataat 1380
aggacaagaa tggcaggaga tggtacagaa ggtacaggca caactagaac aggtctttaa 1440
caaaagtata acctttaact catccgcagg aggggaccta gaaattacaa cacatagttt 1500
taattgtaga ggagaatttt tctattgtaa tacatcagga ttgtttaatg aatcaggagg 1560
gaatgatacc actatcacac tcccatgtaa gataaaacaa attgtgagaa tgtggcagag 1620
agtgggacaa gcaatgtatg cccctcccat cgaggagat attacatgta gatcaaacat 1680
tacagggcta ttattaacaa gagatggtgg ggttaataat actggaaatg agaccttcag 1740
acctggagga ggagatatga gggacaattg gagaagtga ttatataagt ataaaatagt 1800
aaaaattaaa ccactaggaa tagcacccac caaggcaagg agaagagtgg tggagagagg 1860
aaaaagggca gttggactgg gagctgtctt ccttgggttc ttaggagcag caggaagcac 1920
tatgggcgcg ggttcaataa cgctgacggt acaggtcaga caattattgt ctggcatagt 1980
gcaacagcaa agcaatttgc tgagggtat agaggcgag caacatctat tgcaactcac 2040
agtctggggc attaaacagc tccaggcaag agtcctggct gtagaaagat acctaaagga 2100
tcaacagctc ctagggtttt ggggtgctc tggaaaactc atctgcacca ctaatgtgcc 2160
ttggaacact agttggagta ataaatctta tgaggagatt tgggataaca tgacctggat 2220
acaatgggaa agggaaagtca gcaattacac acaacaaata tacagcctaa ttgaagaatc 2280
gcagaaccag caggaaaaga atgaacaaga cttattggca ttggacaagt gggcaagttt 2340
gtggaactgg tttgacataa caaaatggct atggtatata aaaatattta taatgatagt 2400
aggaggttta ataggtttta gaatagtttt tgctgtgctt tctatagtaa atagagttag 2460
gcagggatac tcacctttgt cattccagac cttaccac caccagaggg aaccgacag 2520
gcccgaaga atcgaagaag gaggtggaga gcaagacaga gacagatcag tgcgcttag 2579

```

<210> 52

<211> 2645

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG003; gene=rev

<400> 52

```

atggcaggaa gaagcggaga cgccgacgag gaactcctca gagtcaccag gatcatcaaa 60
atcctgtacc aaagcagtga gtagtaatag ttagtatatg tgatgcaatc ctagaaata 120
gctgcaatag caggactagt agtagcagcc atagcagcca tagttgtgtg gaccatagaa 180
aaataaagaa acaggagaaa atagacaggt tacttgatag aataagagaa agagcagaag 240
atagtggcaa tgagagtga ggggacacag aggaattggc aacacttggt gacatggtgg 300
actttgatcc ttgggttggg gataatttgt agtgcctcaa ataacttggt ggtcacagtc 360
tattatgggg taccagtgtg ggaagacgca gatacccctc tattttgtgc atctgatgct 420
aaagcatata gtactgaaag acataatgtc tgggccacac atgcctgtgt acccacagac 480
cccaaccac aagagataac tctggaaaat gtaacagaaa cttttaacat gtggaaaaat 540
aacatggtag aacagatgca tgaggatata atcagtttat gggatgaaag cctaaagcca 600
tgtgtaaagc taaccctct ctgtgttacc ttaactgta ctaatgtcaa ttgtaacagt 660
aatgtgacca gactgggaa cagtgtggg accaacgcta cgtgtaacat agaagaagca 720
aacaacttaa aaaactgctc tttcaatata accacagaaa taagagataa gaaaaagaca 780

```

```

gaatatgctg ttttctatag acttgatgtg gtaccaatcg atggtaataa taatgtctca 840
aataactata ggctaataaa ttgtaatgtc tcaaccatta aacaagcttg tccaaaggtg 900
tcttttgacc cacttcccat acattattgt gctccagctg gggttgcgat tttaaagtgt 960
aggggtaaga atttctactg aacaggacaa tgtaaaaatg tcagttcagt acaatgtaca 1020
catggaatta aaccagtggg atcaactcaa ttactactaa atggtagtct agcagaagga 1080
gaaatagtaa ttagatctga aaacctcaca gacaatgcca aagtcataat agtacagctt 1140
aataaaacta taggaattaa ttgtaccaga cccaacaaca atacaagaaa aagtataaga 1200
atcggacctg gacaagcgtt ctatgcaaca ggtgaaataa taggacaaga atggcaggag 1260
atgttacaga aggtacaggc acaactagaa caggtcttta acaaaagtat aacctttaac 1320
tcatccgcag gaggggacct agaaattaca acacatagtt ttaattgtag aggagaattt 1380
ttctattgta atacatcagg attgtttaat gaatcaggag ggaatgatac cactatcaca 1440
ctcccatgta agataaaaca aattgtgaga atgtggcaga gagtgggaca agcaatgtat 1500
gcccctcca tcgcaggaga tattacatgt agatcaaaca ttacagggtt attattaaca 1560
agagatgggt gggttaataa tactggaaat gagaccttca gacctggagg aggagatatg 1620
agggacaatt ggagaagtga attatataag tataaaatag taaaaattaa accactagga 1680
atagcaccca ccaaggcaag gagaagagtgt gtggagagag gaaaaagggc agttggactg 1740
ggagctgtct tccttgggtt cttaggagca gcaggagca ctatgggctg ggggtcaata 1800
acgctgacgg tacagggtcag acaattattg tctggcatag tgcaacagca aagcaatttg 1860
ctgagggcta tagagggcga gcaacatcta ttgcaactca cagtctgggg cattaaacag 1920
ctccaggcaa gagtcctggc tgtagaaaga tacctaaagg atcaacagct cctagggatt 1980
tggggctgct ctggaaaact catctgcacc actaatgtgc cttggaacac tagttggagt 2040
aataaatctt atgaggagat ttgggataac atgacctgga tacaatggga aagggaagtc 2100
agcaattaca cacaacaaat atacagccta attgaagaat cgcagaacca gcaggaaaag 2160
aatgaacaag acttattggc attggacaag tgggcaagtt tgtggaactg gtttgacata 2220
acaaaatggc tatggtatat aaaaatattt ataatgatag taggaggttt aataggttta 2280
agaatagttt ttgctgtgct ttctatagta aatagagtta ggcagggtta ctacaccttg 2340
tcattccaga cccttaccga ccaccagagg gaacccgaca ggcccgaaag aatcgaagaa 2400
ggaggtggag agcaagacag agacagatca gtgcgcttag tgagcggatt cttagcactt 2460
gcctgggacg acctgcgga cctgtgcctc ttcagctacc accgattgag agacttagtc 2520
ttgattgcag cgaggacagc agaactcctg agacgcagca gtctccaggg actgagactg 2580
gggtgggagg gcctcaaata tctgtggaat ctctgttgtt attgggtctg ggaactaaag 2640
aatag
2645

```

<210> 53

<211> 230

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG003; gene=vpu

<400> 53

```

atgcaatcct tagaaatagc tgcaatagca ggactagtag tagcagccat agcagccata 60
gttgtgtgga ccatagaaaa ataaagaaac aggagaaaat agacaggtta cttgatagaa 120
taagagaaaag agcagaagat agtggcaatg agagtgaagg ggacacagag gaattggcaa 180
cacttgtgga catggtggac tttgatcctt gggttggtga taattttagt 230

```

<210> 54

<211> 2538  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG003; gene=env

<400> 54

```

atgagagtga aggggacaca gaggaattgg caacacttgt ggacatgggtg gactttgatc 60
cttgggttgg tgataatttg tagtgacctca aataacttgt gggtcacagt ctattatggg 120
gtaccagtgt ggggaagacgc agatacccct ctatttttgtg catctgatgc taaagcatat 180
agtactgaaa gacataatgt ctggggccaca catgcctgtg taccacacaga ccccaaccca 240
caagagataa ctctggaaaa tgtaacagaa acttttaaca tgtggaaaaa taacatggta 300
gaacagatgc atgaggatat aatcagttta tgggatgaaa gcctaaagcc atgtgtaaag 360
ctaaccctc tctgtgttac cttaaactgt actaatgtca attgtaacag taatgtgacc 420
agcactggga acagtgtctg gaccaacgct acgtgtaaca tagaagaagc aaacaactta 480
aaaaactgct ctttcaatat aaccacagaa ataagagata agaaaaagac agaatatgcg 540
cttttctata gacttgatgt ggtaccaatc gatggtaata ataatgtctc aaataactat 600
aggctaataa attgtaatgt ctcaaccatt aaacaagctt gtccaaaggt gtcttttgac 660
ccacttccca tacattattg tgctccagct gggtttgcg ttttaaagtg taggggtaag 720
aatttctactg gaacaggaca atgtaaaaat gtcagttcag tacaatgtac acatggaatt 780
aaaccagtgg tatcaactca attactacta aatggtagtc tagcagaagg agaaatagta 840
attagatctg aaaacctcac agacaatgcc aaagtcataa tagtacagct taataaaact 900
ataggaatta attgtaccag acccaacaac aatacaagaa aaagtataag aatcggacct 960
ggacaagcgt tctatgcaac aggtgaaata ataggacaag aatggcagga gatgttacag 1020
aaggtacagg cacaactaga acaggtcttt aacaaaagta taacctttaa ctcatccgca 1080
ggaggggacc tagaaattac aacacatagt ttaattgtg gaggagaatt tttctattgt 1140
aatacatcag gattgtttta tgaatcagga gggaatgata ccactatcac actcccatgt 1200
aagataaaac aaattgtgag aatgtggcag agagtgggac aagcaatgta tgccccctcc 1260
atcgcaggag atattacatg tagatcaaac attacagggc tattattaac aagagatggg 1320
gggttaata atactggaaa tgagaccttc agacctggag gaggagatat gagggacaat 1380
tggaagaagt aattatataa gtataaaata gtaaaaatta aaccactagg aatagcacc 1440
accaaggcaa ggagaagagt ggtggagaga ggaaaaaggg cagttggact gggagctgtc 1500
ttccttgggt tcttaggagc agcaggaagc actatgggcg cgggtgcaat aacgctgacg 1560
gtacaggtca gacaattatt gtctggcata gtgcaacagc aaagcaattt gctgagggct 1620
atagaggcgc agcaacatct attgcaactc acagtctggg gcattaaaca gctccaggca 1680
agagtcctgg ctgtagaaag atacctaaag gatcaacagc tcctagggat ttggggctgc 1740
tctggaaaac tcatctgcac cactaatgtg ccttggaaac ctagttggag taataaatct 1800
tatgaggaga tttgggataa catgacctgg atacaatggg aaagggaagt cagcaattac 1860
acacaacaaa tatacagcct aattgaagaa tcgcagaacc agcaggaaaa gaatgaacaa 1920
gacttattgg cattggacaa gtgggcaagt ttgtggaact ggtttgacat aacaaaatgg 1980
ctatggtata taaaaatatt tataatgata gtaggaggtt taataggttt aagaatagtt 2040
tttctgtgct tttctatagt aaatagagtt aggcagggat actcaccttt gtcattccag 2100
acccttacc accaccagag ggaacccgac agggccgaaa gaatcgaaga aggaggtgga 2160
gagcaagaca gagacagatc agtgcgctta gtgagcggat tcttagcact tgctgggac 2220
gacctgcgga acctgtgcct cttcagctac caccgattga gagacttagt cttgattgca 2280
gagaggacag cagaactcct gagacgcagc agtctccagg gactgagact ggggtgggag 2340
ggcctcaaat atctgtggaa tctcctgttg tattgggggtc gggaactaaa gaatagtgtc 2400

```

attaatttga ttgatacaat agcaatagca gtagctaact ggacagatag ggttatagaa 2460  
 gtagcacaag gagcttgtag agctattctc aacataccta gaaggataag acaaggcttg 2520  
 gaaagagctt tgctataa 2538

<210> 55

<211> 621

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=92NG003; gene=nef

<400> 55

ataggaggca agtgggtcaaa aagtagcata gttggatggc ccgcggtaa ggagagaata 60  
 agacaaaccc ctccagcaga aggagtagga gcagcacctc aagacttagc taggcatgga 120  
 gcaatcacaa gcagcaatac agcaciaaact aatcctgatt gtgcctggct agaagcacia 180  
 caggagaatt cagaggtagg ctttccagtc agacaacagg tacctttgag accaatgact 240  
 tataaggctg cctttgatct cagcttcttt ttaaaagaaa aggggggact ggatgggcta 300  
 atttactcta agaaaagaca agacatcctt gacctatggg tctataatac acaaggatac 360  
 ttcccagatt ggcagaacta cactccaggg ccagggacta gattcccact gacatttcg 420  
 tgggtgcttca aactagtacc aatggatcca gcagagatag aggaagccaa taaaggagag 480  
 aacaacagtt tattacaccc tatctgcca catggcctgg aagatgcgga cagagaagt 540  
 ctggtatgga gatttgacag tagcctagca cggagacaca tagcccgaga acaacatcc 600  
 gagtactata aggactgctg a 621

<210> 56

<211> 1438

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR029; gene=gag

<400> 56

atgggtgcga gagcgtcagt aataagcggg ggagaattag ataatggga aaaaattagg 60  
 ttaaggccag gaggacataa aaaatataga ttaaaacata tagtatgggc aagcagggga 120  
 gctagaacga ttcgcagtta atcctggcct tttagagaca tcagaaggct gtagacaaat 180  
 actggaacag ctacaaccag cccttaagac gggatcagaa gaacttagat cattatataa 240  
 tacagtagca accctctatt gtgtacatca aaagatagat gtaaaagaca ccaaggaagc 300  
 tttagaaaag atagaggaag agcaaaacaa agtaagaaaa aggcacagca agcagcagct 360  
 aacacaggaa acaacagcca ggtcagccaa aattacccta tagtgcagaa ccttcagggg 420  
 caaatggtac accaggccat atcacctaga actttaaatg catgggtaaa agtagtagaa 480  
 gagaaggctt ttagcccaga agtaataccc atgttttcag cattatcaga aggagccacc 540  
 ccacaagatt taaacaccat gctaaacaca gtggggggac atcaagcagc tatgcaaagt 600  
 ttaaaagaaa ccatcaatga ggaagctgca gaatgggaca gagtacatcc agtgcagtca 660  
 ggacctatcc caccaggcca gatgaggga cctaggggaa gtgatatagc tggaactact 720  
 agtacccttc aggaacaaat acaatggatg acaagcaacc cacctgtccc agtgggagaa 780  
 atttataaaa gatggatcat cctaggatta aataaaatag taagaatgta tagccctacc 840

```

agcattctgg gcataagaca aggaccaaag gaacccttta gagactatgt agatcgattt 900
tataaaactc taagagcaga gcaaacttca caggatgtaa aaaattggat gacagaaacc 960
ttgttggtcc aaaatgcgaa cccagattgc aaaaccattt taaaagcatt gggaccagca 1020
gctacactag aagaaatgat gacagcatgt cagggagtgg ggggacccgg ccataaagca 1080
agagttttgg cagaagcaat gagccaagta acaaattcag gtaccataat gatgcagaga 1140
ggcaatttta ggaaccaaag aaagactatt aagtgtttca attgtggcaa agaagggcac 1200
atagccaaaa attgcagggc ccctaggaaa aagggtctgt ggaaatgtgg aaaggaagga 1260
caccagatga aagattgtac tgagagacag gctaattttt tagggaaaat ctggccttcc 1320
cacaagggaa ggccagggaa tttccttcag agcagaccag agccaacagc cccaccagca 1380
gagagcttca ggtttgggga agaggtaaca actccctctc agaaacagga gccgatag 1438

```

<210> 57

<211> 3012

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR029; gene=pol; note=NH2-terminus  
uncertain

<400> 57

```

tttttttaggg aaaatctggc cttcccacaa gggaaggcca gggaatttcc ttcagagcag 60
accagagcca acagccccac cagcagagag cttcaggttt ggggaagagg taacaactcc 120
ctctcagaaa caggagccga tagacaagga gatgtatcct ttggcttccc tcagatcact 180
ctttggcaac gacccctcgt cacagtaaag ataggggggc aactaaagga agccctatta 240
gataccggag cagatgatac agtattagaa gaaataaatt taccaggaag atggaaacca 300
aaaatgatag gggaatttgg aggtttttatc aaagtaagac agtatgatca aatacccata 360
gaaattttgtg gacgtaaagc tacaggtaca gtattagtag gacctacacc tgtcaacata 420
attggaagaa atctgttgac tcagattggc tgcactttaa attttcccat tagtcctatt 480
gaaactgtac cagtaaaaatt gaagccagga atggatggcc caagggttaa acaatggcca 540
ttgacagaag aaaaaataaa agcattaaca gaaatatgta cagaaatgga aaaagaagga 600
aaaatttcaa aaattgggccc cgaaaatcca tacaatactc cagtatttgc cataaagaaa 660
aaagatagta ctaaattggag aaaattagta gatttcagag aacttaataa gagaactcaa 720
gacttctggg aagttcagtt agggatacca catcccgcag ggttaaagaa gaaaaaatca 780
gtaacagtac tggatgtggg tgatgcatac ttttcagttc cattagataa agacttcagg 840
aagtatactg cattttaccat acctagtaca aacaatgaaa caccagggct tagatatcag 900
tacaatgtgc ttccacaggg gtggaaaagga tcaccagcaa tattccaaag tagcatgaca 960
aaaatcttag agccttttag aaaacaaaat ccagacatag ttatctatca atacatggat 1020
gatttgtatg taggatctga cttagaaata gggcagcata gaactaagat agaggaattg 1080
agacagcatt tgttgagggtg gggatttacc acaccagaca aaaaacatca gaaagaacct 1140
ccatttcctt ggatgggtta tgaactccat cctgataaat ggacagtaca gcctatagt 1200
ctgccagaaa aagacagctg gactgtcaat gacatacaga agttagtggg aaaattgaat 1260
tgggcaagtc agatttatgc agggattaaa gtaaggcaat tatgtaaact ccttagggga 1320
accaaagcac taacagaagt agtaccacta acagcagagg cagagctaga actggcagaa 1380
aacagggaga ttctaaaaga accagtacat ggagtgtatt atgaccctc aaaagactta 1440
atagcagaaa tacagaaaca ggggcaaggc caatggacat atcaaattta tcaagagcca 1500
tataaaaatt tgaaaacagg aaagtatgca aggatgaggg gtgccacac taatgatgta 1560
aaacaactaa cagaggcagt gcaaaaaata accacagaaa gcatagtaat atggggaaag 1620

```

```

attcctaaat ttaaactacc catacaaaaa gaaacgtggg aagcatggtg gatagagtat 1680
tggcaagcca cctggattcc tgagtgggag tttgtcaata cccctccctt agtgaaatta 1740
tgggtaccagt tagagaaaaga acccatagta ggagcagaaa ctttctatgt agatggggca 1800
gctaataggg aaactaaatt aggaaaagca ggatatgtga ctgacagagg aagacaaaaa 1860
gttgtccccc taacggacac aacaaatcag aaaactgagt tacaagcaat tcatctagct 1920
ttgcaggatt cgggattaga agtaaacata gtaacagact cacaatatgc attaggaatc 1980
attcaagcac aaccagataa gagtgaatta gaaatagtca atcaaataat agagcagtta 2040
ataaaaaagg aaaagatcta cctggcatgg gtaccagcac acaaaggaat tggaggaaat 2100
gaacaagtag acaaattagt cagttctgga atcaggaaag tactattttt agatggaata 2160
gataaggccc aagaagaaca tgagaaatat cacaataatt ggagagcaat ggctagtgc 2220
ttaaacatac cacctgtagt agcaaaaaga atagtagcca gctgtgataa atgtcagcta 2280
aaaggagaag ccatgcatgg acaagtagac tgtagtccag gaatatggca gctagattgt 2340
acacacttag aaggaaaagt tatcctggta gcagtgcag tagccggtgg atatatagaa 2400
gcagaagtta ttccagcaga gacagggcaa gaaacagcat actttctctt aaaattagca 2460
ggaagatggc cagtaaaaac aatacacaca gacaatggca gcaatttcac cagtactaca 2520
gtcaaggccg cctgttggtg ggcggggatc aagcaggaat ttggcattcc ctacaatccc 2580
caaagtcaag gagtaataga atctatgaat aaagaattaa agaaaattat aggacaggta 2640
agggatcagg ctgaacatct taagacagca gtacaaacgg cagtattcat ccacaatttt 2700
aaaagaaaag gggggattgg ggggtacagt gcaggggaaa gaatagtaga cataatagca 2760
acagacatac agactaaaga attacaaaaa caaattacaa aaattcaaaa ttttcgggtt 2820
tattacagag acagcagaga tccactttgg aaaggaccag caaagcttct ctggaaaggt 2880
gaaggggcag tagtaataga agataatagt gacataaaag tagtgccaag aagaaaagta 2940
aagatcatta gggattatgg aaaacagatg gcagggtggtg attgtgtggc aggtagacag 3000
gatgaggatt aa 3012

```

<210> 58

<211> 579

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR029; gene=vif

<400> 58

```

atggaaaaca gatggcaggt ggtgattgtg tggcaggtag acaggatgag gattaacaca 60
tggaaaagtt tagtaaaata ccatatgcat gtttcaaaga aagccaaaag atggttttat 120
agacatcact ttgaaagcag gcatccaaga gtaagttcag aagtacatat ccactagag 180
gaagctaaat tagtaataac aacatattgg gggctgcata caggagaaag agattggcat 240
ctgggtcagg gagtctccat agaatggagg caggggaggt ataggacaca aatagaccct 300
ggcctggcag accaactgat ccatatatat tattttgatt gtttttcaga atctgccata 360
aggaaagcca tattaggaca tagaattagc ctaggtgtg attatcaagc aggacataac 420
aaggtaggat ctctacagta cttggcacta acagcattaa taaaaccaa aaagagaaag 480
ccacctttgc ccagtgttaa gaaactgaca gaggatagat ggaacaagcc ccagaagacc 540
aaggaccaca gagggagcca tacaatgaat ggacactag 579

```

<210> 59

<211> 291

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR029; gene=vpr

<400> 59

```
atggaacaag cccagaaga ccaaggacca cagagggagc catacaatga atggacacta 60
gaacttttag aggaacttaa gagtgaagct gttagacatt ttcctaggtt atggctccat 120
agcttaggac aacatatcta tgaaacttat ggggatactt gggcaggagt ggaagccata 180
ataagaattc tgcaacaact gctgtttatt catttcagaa ttggatgtca acatagcaga 240
ataggcatta atcgacagag gagagcaagg aatggagcca gtagatccta g          291
```

<210> 60

<211> 2601

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR029; gene=tat

<400> 60

```
atggagccag tagatcctag actagagccc tggaagcatc caggaagtcg gcctcagacg 60
gcttgtaata gttgctattg taaaaagtgt tgctttcatt gtcaagtttg tttcacaaca 120
aagggttag gcatctccta tggcaggaag aagcggagac agcgacacag aactcctcaa 180
agcagtcagc tacatcaaga tcctgtacca aagcagtaag tattgttaag taatatatgt 240
aatgtcatat ttgttagtaa taggttttagc agcattaata gcagcactaa taatagcaat 300
agttgtgtgg actatagcat atatagaata tagggaaacta gtaaggcaaa gaaaaataaa 360
taggttatat aaaagaataa gagaaagagc agaagacagt ggcaatgaga gtgaggggga 420
tgcagaggaa ttggcagcac ttggggaaat ggggcctttt attcctgggg atattgataa 480
tctgtaatgc tgaaaacttg tgggtcacag tctattatgg ggtacctgtg tggaaagaag 540
caaccactac tttattctgt gcatcagatg ctaaagcata tgaaaaagaa gcacataatg 600
tctgggctac acatgcctgt gtaccacag atcccaatcc acaagaagta gttctggaaa 660
atgtaacaga aaattttgat atgtggaaaa ataacatggg agaacaaatg catacagata 720
taatcagttt atgggatcaa agcctgaagc catgtgtgaa gttaacccca ctctgtgtta 780
ctttacgttg tagtaatgcc actaccaaca gtactcaaaa cgacaccctg aaggaagagc 840
caggggcaat acaaaactgt tctttcaata tgaccacaga agtaagagat aagcagctga 900
aagtacatgc acttttttat aggcttgata tagtaccaat cagcaatgat aatagtagca 960
atgataatag tagcagagaa tacaggctaa taaattgtaa tacctcaacc cttacacagg 1020
cttgtccaaa ggtatcttgg gatccaattc ccatacatta ttgtgctcca gctgggtatg 1080
cgatttctaaa gtgtaatgat aaaaaattca atgggacggg gccatgcagg aatgtcagca 1140
cagtacaatg tacacatgga attaaaccag tggatatcaac tcaattgttg ttaaatggca 1200
gcctagcaga aaaagatata ataatcagat ctcaaaatat ctgagataat gcaaaaacca 1260
taatagtaca acttaatgta tctgtgccga ttaattgtac aagacccaac aacaatacaa 1320
gaaaaagtat accaatagga ccaggacgag cattttatac aacaggagaa ataataggag 1380
acatcagaaa ggcacattgt aacgttagtg gaacaaaatg gaatgagacg ttagaaaagg 1440
taagggcaaa gttaaagcct catttcccta atgcaacaat aaaatttaac tcacctcag 1500
gaggggacct agaaattaca atgcatagtt ttaattgtag aggagaattt ttctactgca 1560
atacatcagg actgtttaat gacacagtag acaatggcac tatcactctc ccatgtcgaa 1620
```



```

taaagcaaat tgtaaatatg tggcaggaag tggggcgagc aatgtatgcc gctcccattg 1680
caggaaacat tacctgtagc tcaaataatta caggtctact attgacaaga gatggtggtc 1740
agaataatca gacggaggag accttcagac ctggggggagg aaatatgaaa gacaactgga 1800
gaagtgaatt atataaatat aaagtagtag aaattgagcc attaggagta gcacccacca 1860
aggcaaaaag acaagtgggtg aagagagaaa aaagagcagt gggaatggga gctttgttcc 1920
ttgggttctt gggagcagca ggaagcacta tggggcgagc gtcaataacg ctgacggcac 1980
aggccagaca attattgtct ggcatagtgc aacagcagaa taatttgctg agggctattg 2040
aagcgcaaca gcatctgttg cagctcacag tctggggcat taaacagctc caggcaagaa 2100
tcctggctgt ggaaagatac ctaaaggatc aacagctcct agggcttttg ggctgctctg 2160
gaaaactcat ctgcaccact gatgtgccct ggaactctag ttggagtaac aaatctcagg 2220
agaagatctg ggggaacatg acctggatgg agtgggaaaa agagattagc aattactcaa 2280
acgaaatata taggttaatt gaagagtcgc agaaccagca ggaaaagaat gaacaagaat 2340
tattggcatt ggacaaatgg gcaagtctgt ggaattgggtt tgacatatca aaatggctgt 2400
ggtatataaa aatattcata atgatatag gaggttgat aggtttaaga atagtttttg 2460
ctgtgctttc tatagtaa atagtttagga agggatactc acctttgtca ttacagaccc 2520
gcttcccaag cccaaggga cccgacaggc ccgaaggaat cgaagaagga ggtggagagc 2580
caggcaaaga cagatccgtg a 2601

```

<210> 61

<211> 2652

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR029; gene=rev

<400> 61

```

atggcaggaa gaagcggaga cagcgacaca gaactcctca aagcagtcag ctacatcaag 60
atcctgtacc aaagcagtaa gtattgttaa gtaatatatg taatgtcata tttgttagta 120
ataggtttag cagcattaat agcagcacta ataatagcaa tagttgtgtg gactatagca 180
tatatagaat atagggaact agtaaggcaa agaaaaataa ataggttata taaaagaata 240
agagaaaagag cagaagacag tggcaatgag agtgagggggg atgcagagga attggcagca 300
cttggggaaa tggggccttt tattcctggg gatattgata atctgtaatg ctgaaaactt 360
gtgggtcaca gtctattatg gggtagctgt gtggaaagaa gcaaccacta ctttattctg 420
tgcacagat gctaaagcat atgaaaaaga agcacataat gtctgggcta cacatgcctg 480
tgtaccaca gatcccaatc cacaagaagt agttctggaa aatgtaacag aaaattttga 540
tatgtggaaa aataacatgg tagaacaat gcatacagat ataatacagtt tatgggatca 600
aagcctgaag ccatgtgtga agttaacccc actctgtgtt actttacggt gtagtaatgc 660
cactaccaac agtactcaaa acgacaccct gaaggaagag ccaggggcaa tacaaaactg 720
ttctttcaat atgaccacag aagtaagaga taagcagctg aaagtacatg cactttttta 780
taggcttgat atagtaccaa tcagcaatga taatagtagc aatgataata gtagcagaga 840
atacaggcta ataaattgta atacctcaac ccttacacag gcttgtccaa aggtatcttg 900
ggatccaatt cccatacatt attgtgctcc agctgggtat gcgattctaa agtgtaatga 960
taaaaaattc aatgggacgg ggccatgcag gaatgtcagc acagtacaat gtacacatgg 1020
aattaaacca gtggtatcaa ctcaattggt gttaaatggc agcctagcag aaaaagatat 1080
aataatcaga tctcaaaata tctcagataa tgcaaaaacc ataatagtac aacttaatgt 1140
atctgtgccg attaattgta caagacccaa caacaataca agaaaaagta taccaatagg 1200
accaggacga gcattttata caacaggaga aataatagga gacatcagaa aggcacattg 1260

```

```

taacgttagt ggaacaaaat ggaatgagac gttagaaaag gtaagggcaa agttaagcc 1320
tcatttcctt aatgcaacaa taaaatttaa ctcatcctca ggaggggacc tagaaattac 1380
aatgcatagt tttaattgta gaggagaatt tttctactgc aatacatcag gactgtttta 1440
tgacacagta gacaatggca ctatcactct cccatgtcga ataaagcaaa ttgtaaatat 1500
gtggcaggaa gtggggcgag caatgtatgc cgctcccatt gcaggaaaca ttacctgtag 1560
ctcaaattatt acaggtctac tattgacaag agatggtggt cagaataatc agacggagga 1620
gaccttcaga cctgggggag gaaatatgaa agacaactgg agaagtgaat tatataaata 1680
taaagtagta gaaattgagc cattaggagt agcaccacc aaggcaaaaa gacaagtggg 1740
gaagagagaa aaaagagcag tgggaatggg agctttgttc cttgggttct tgggagcagc 1800
aggaagcact atgggcgagc cgtcaataac gctgacggca caggccagac aattattgtc 1860
tggcatagtg caacagcaga ataatttgcg gagggctatt gaagcgcaac agcatctggt 1920
gcagctcaca gtctggggca ttaaacagct ccaggcaaga atcctggctg tggaaagata 1980
cctaaaggat caacagctcc tagggctttg gggctgctct ggaaaactca tctgcaccac 2040
tgatgtgccc tggaaactcta gttggagtaa caaatctcag gagaagatct gggggaacat 2100
gacctggatg gagtgggaaa aagagattag caattactca aacgaaatat ataggttaat 2160
tgaagagtcg cagaaccagc aggaaaagaa tgaacaagaa ttattggcat tggacaaatg 2220
ggcaagtctg tgggaattggt ttgacatatc aaaatggctg tggatatata aaatattcat 2280
aatgatagta ggaggcttga taggcttaag aatagttttt gctgtgcttt ctatagtaaa 2340
tagagttagg aagggatact cacctttgtc attacagacc cgcttcccaa gcccaaggga 2400
acccgacagg cccgaaggaa tcgaagaagg aggtggagag ccaggcaaaag acagatccgt 2460
gagattagtg aacggattct tagctcttgt ctgggacgac ctgaggaacc tgtgcctctt 2520
cagctaccgc cacttgagag acttcatatt aattgcagcg aggattgtgg acaggggact 2580
gaagaggggg tgggaagccc tcaaacttct ggggaatctc gcgctgtatt ggagtcagga 2640
actaaagaat ag 2652

```

<210> 62

<211> 2529

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR029; gene=env

<400> 62

```

atgagagtga gggggatgca gaggaattgg cagcacttgg ggaaatgggg cctttttattc 60
ctggggatat tgataatctg taatgctgaa aacttgtggg tcacagtcta ttatggggta 120
cctgtgtgga aagaagcaac cactacttta ttctgtgcat cagatgctaa agcatatgaa 180
aaagaagcac ataatgtctg ggctacacat gcctgtgtac ccacagatcc caatccacaa 240
gaagtagttc tggaaaaatgt aacagaaaaat tttgatatgt ggaaaaataa catggtagaa 300
caaatgcata cagatatata cagtttatgg gatcaaagcc tgaagccatg tgtgaagtta 360
acccactctt gtgttacttt acgtttagtg aatgccacta ccaacagtac tcaaaacgac 420
accctgaagg aagagccagg ggcaatacaa aactgttctt tcaatatgac cacagaagta 480
agagataagc agctgaaagt acatgcactt ttttataggc ttgatatagt accaatcagc 540
aatgataata gtagcaatga taatagtagc agagaatata ggctaataaa ttgtaatacc 600
tcaaccctta cacaggcttg tccaaaggta tcttgggatc caattcccat acattattgt 660
gctccagctg ggtatgcgat tctaaagtgt aatgataaaa aattcaatgg gacggggcca 720
tgcaggaatg tcagcacagt acaatgtaca catggaatta aaccagtggg atcaactcaa 780
ttgttgtaaa atggcagcct agcagaaaaa gatataataa tcagatctca aaatatctca 840

```

|            |            |            |             |             |             |      |
|------------|------------|------------|-------------|-------------|-------------|------|
| gataatgcaa | aaaccataat | agtacaactt | aatgtatctg  | tgccgattaa  | ttgtacaaga  | 900  |
| cccaacaaca | atacaagaaa | aagtatacca | ataggaccag  | gacgagcatt  | ttatacaaca  | 960  |
| ggagaaataa | taggagacat | cagaaaggca | cattgtaacg  | ttagtggaac  | aaaatggaat  | 1020 |
| gagacgttag | aaaaggtaag | ggcaaagtta | aagcctcatt  | tccctaatagc | aacaataaaa  | 1080 |
| tttaactcat | cctcaggagg | ggacctagaa | attacaatgc  | atagttttaa  | ttgtagagga  | 1140 |
| gaatTTTTCT | actgcaatac | atcaggactg | tttaatgaca  | cagtagacaa  | tggcactatc  | 1200 |
| actctcccat | gtcgaataaa | gcaaattgta | aatatgtggc  | aggaagtggg  | gcgagcaatg  | 1260 |
| tatgccgctc | ccattgcagg | aaacattacc | tgtagctcaa  | atattacagg  | tctactattg  | 1320 |
| acaagagatg | gtggtcagaa | taatcagacg | gaggagacct  | tcagacctgg  | gggaggaaat  | 1380 |
| atgaaagaca | actggagaag | tgaattatat | aaatataaag  | tagtagaaat  | tgagccatta  | 1440 |
| ggagtagcac | ccaccaaggc | aaaaagacaa | gtgggtgaaga | gagaaaaaag  | agcagtggga  | 1500 |
| atgggagctt | tgttccttgg | gttcttggga | gcagcaggaa  | gcactatggg  | cgcagcgtca  | 1560 |
| ataacgctga | cggcacaggc | cagacaatta | ttgtctggca  | tagtgcaaca  | gcagaataat  | 1620 |
| ttgctgaggg | ctattgaagc | gcaacagcat | ctgttgcagc  | tcacagtctg  | gggcattaaa  | 1680 |
| cagctccagg | caagaatcct | ggctgtggaa | agatacctaa  | aggatcaaca  | gctcctaggg  | 1740 |
| ctttggggct | gctctggaaa | actcatctgc | accactgatg  | tgccctggaa  | ctctagttagg | 1800 |
| agtaacaaat | ctcaggagaa | gatctggggg | aacatgacct  | ggatggagtg  | ggaaaaagag  | 1860 |
| attagcaatt | actcaaacga | aatatatagg | ttaattgaag  | agtcgcagaa  | ccagcaggaa  | 1920 |
| aagaatgaac | aagaattatt | ggcattggac | aaatgggcaa  | gtctgtggaa  | ttggtttgac  | 1980 |
| atatcaaaat | ggctgtggta | tataaaaata | ttcataatga  | tagtaggagg  | cttgataggc  | 2040 |
| ttaagaatag | tttttgctgt | gctttctata | gtaaatagag  | ttaggaaggg  | atactcacct  | 2100 |
| ttgtcattac | agacccgctt | cccaagccca | aggggaacccg | acaggcccga  | aggaatcgaa  | 2160 |
| gaaggaggtg | gagagccagg | caaagacaga | tccgtgagat  | tagtgaacgg  | attcttagct  | 2220 |
| cttgtctggg | acgacctgag | gaacctgtgc | ctcttcagct  | accgccactt  | gagagacttc  | 2280 |
| atattaattg | cagcgaggat | tgtggacagg | ggactgaaga  | gggggtggga  | agccctcaaa  | 2340 |
| cttctgggga | atctcgcgct | gtattggagt | caggaactaa  | agaatagtgc  | tattagcttg  | 2400 |
| cttaatacca | cagcaatagt | agtagctgag | gggacagata  | gagttataga  | agctttgcaa  | 2460 |
| agagcgggta | gagctgttct | taacgtacct | agaagaataa  | gacagggctt  | ggaaagggct  | 2520 |
| ttgctataa  |            |            |             |             |             | 2529 |

<210> 63

<211> 621

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=93BR029; gene=nef

<400> 63

|             |             |            |            |            |            |     |
|-------------|-------------|------------|------------|------------|------------|-----|
| atgggtagca  | agtgggtcaaa | aagtagtata | gttgggtggc | ctgctataag | ggaaagatta | 60  |
| agacaaaccc  | ctccagcagc  | agaaggggtg | ggagcagtgt | ctcaagactt | agaaagacgg | 120 |
| ggggcaatta  | caagcagcaa  | tactggagct | aataatcctg | acttggcctg | gctggaggca | 180 |
| caagaggaag  | aggaagtagg  | ctttccagtc | agacctcagg | tacctttaag | accaatgact | 240 |
| tataagggag  | ctcttgatct  | cagtcacttt | ttaaaagaaa | aggggggact | ggaagggtta | 300 |
| atattattcca | agaaaagaca  | agagatcctt | gatctgtggg | tttaccacac | acaaggctac | 360 |
| ttccctgatt  | ggcagaacta  | cacaccaggg | ccagggacca | gatatccact | gaccttaggg | 420 |
| tggtgcttca  | agctagtacc  | agttgaccca | gaggaggtag | aaaaggccaa | tgaaggagag | 480 |
| aacaactgct  | tgctacaccc  | catgagccaa | catggaatgg | aggatgaaga | cagagaaata | 540 |

ctgcagtgga ggtttgacag ccgcctagca tttcatcaca tggccccgaga gctgcatccg 600  
gagtactaca aggactgctg a 621

<210> 64

<211> 1503

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CY032.3; gene=gag

<400> 64

```
atgggtgcga gagcgtcagt attaagtggg ggaaaattag atgcatggga gaggattcgg 60
ttaagggcag ggggaaagaa aaaatataga ctgaaacatc tagtatgggc aagcagagag 120
ttggaaagat tcgcacttaa ccctggcctt ttgaaacag cagaaggatg tcaacaatta 180
atggaacagt tacaatcaac tctcaaaaca ggatcagaag aacttagatc attatataat 240
actataacaa ccctctggtg cgtacatcaa agaatagatg tacaagacac caaggaagct 300
ttagataaaa tagaggaaat acaaagtaag agcaagcaaa agacacagca ggcagcagct 360
gccgcaggag gtagcagcaa tgtcagccaa aattacccta tagtgcaaaa tgcacaaggg 420
caaatggtac atcagagcat ttcacctaga actttgaatg catgggtaaa agtaatagaa 480
gaaaaggctt tcagcccaga agtaataccc atgttctcag cattatcaga gggagccacc 540
ccacaagatt tgaacatgat gctaaatata gtggggggac accaggcagc aatgcaaagt 600
ttaaagata ccatcaatga ggaagctgca gactgggaca ggacacatcc agtacatgca 660
gggcttattc caccaggcca gatgagagaa ccaaggggaa gtgatatagc aggaactact 720
agtacccttc aagaacaaat aggatggatg acaagcaacc cacctgtccc agtgggagaa 780
atctataaaa gatggataat cttggggtta aataaaatag taagaacgta tagccccatt 840
agcatcttgg acataagaca aggacaaaaa gaacccttca gagattatgt agataggttc 900
ttaaatgtc tcagagcaga acaagctacc caggaggtga aaaattggat gacagaaacc 960
ctgctggtcc aaaatgcgaa tccagactgt aagtccatct taaaagcatt aggaacaggg 1020
gctacattag aagaaatgat gacagcatgt caggagtggt gaggaccag ccataaagca 1080
agagttttag ctgaggcaat gagccaggca tcaaatgcag cagcagccat aatgatgcag 1140
aaaagcaaat ttaagggcca aagaagaact attaagtgtt tcaactgtgt caaggaagga 1200
catctagcca gaaattgcag ggcccctagg aaaaagggtg gctggaagtg tggaaaggag 1260
ggacatcaaa tgaaagactg cactgagaga caggctaatt ttttagggag aatgtggcct 1320
tccagcaaag ggaggccagg aaattttctt cagaacaggc cagagccaac agccccgcc 1380
gcggaatgct tagagaggaa agaggagaca acctcctctc tgaagcagga accgagggac 1440
aaggaactat atcctttaac ttccctcaa tcactctttg gcagcgaccc cttgtcacia 1500
taa 1503
```

<210> 65

<211> 3009

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CT032.3; gene=pol

<400> 65

|             |             |             |             |             |             |      |
|-------------|-------------|-------------|-------------|-------------|-------------|------|
| ttttttaggg  | agaatgtggc  | cttccagcaa  | agggaggcca  | ggaaattttc  | ttcagaacag  | 60   |
| gccagagcca  | acagccccgc  | ccgcggaatg  | cttagagagg  | aaagaggaga  | caacctcttc  | 120  |
| tctgaagcag  | gaaccgaggg  | acaaggaact  | atataccttta | acttccctca  | aatacactctt | 180  |
| tggcagcgac  | cccttgtcac  | aataaaaacta | gggggacaga  | taagggaggc  | tcttttagat  | 240  |
| acaggagcag  | atgatacagt  | attagaagaa  | ataaatttgc  | caggaaaatg  | gaagccaaaa  | 300  |
| atgatagggg  | gaatcgagg   | ttttatcaaa  | gtaagacaat  | atgatcagat  | acctatagaa  | 360  |
| atttgtggaa  | aaaaggccat  | aggcacagt   | ttagtaggac  | ctacacctgt  | caacataatt  | 420  |
| ggacgaaaca  | tgttgactca  | gcttggttgt  | actttaaatt  | ttccaattag  | tcctattgaa  | 480  |
| actgtaccag  | taaaattaaa  | gccaggaatg  | gatggcccaa  | aggttaaaca  | atggccattg  | 540  |
| acagaagaaa  | aaataaaagc  | cttaacagag  | atatgtacag  | acatggaaaa  | ggaaggcaag  | 600  |
| atttcaaaaa  | ttgggcctga  | aaatccatac  | aatactccaa  | tatttgctat  | aaagaaaaaa  | 660  |
| gacagcacta  | aatggagaaa  | attagtagat  | ttcagagaac  | tcaataaaaag | aactcaggac  | 720  |
| ttctgggaag  | ttcagttagg  | aataccgcac  | ccagcagggg  | taaagaagaa  | aaaatcagta  | 780  |
| acagtattgg  | atgtggggga  | tgcataTTTT  | tcagttccct  | tagatccaga  | gttcaggaag  | 840  |
| tacactgcat  | tcaccatacc  | tagtaccaac  | aatgagacac  | caggaattag  | atatcagtac  | 900  |
| aatgtgcttc  | cacagggctg  | gaaaggatca  | ccagcaatat  | tccaatgtag  | catgacaaaa  | 960  |
| atcttagagc  | ccttttagatt | caaaaaccca  | gaaatagtca  | tataccaata  | tatggatgat  | 1020 |
| ttgtatgtag  | ggtctgactt  | agaaataggg  | caacatagag  | caaaaataga  | agagctaaga  | 1080 |
| gagcatctat  | tgagatgggg  | attcaccaca  | ccagacaaaa  | aacatcagaa  | agaacccccca | 1140 |
| tttctttgga  | tggggtatga  | actccatcct  | gacaaatgga  | cagtgcagcc  | tatacaaccg  | 1200 |
| gcagaaaagg  | atagctggac  | tgtcaacgat  | atccagaagt  | tagtgggaaa  | actaaattgg  | 1260 |
| gcaagtcaga  | tttatccagg  | gattaaagta  | aagcaattat  | gtaaacttct  | taggggagct  | 1320 |
| aaagccctaa  | cagacatagt  | accactaact  | acagaggcag  | agttagaatt  | agcagagAAC  | 1380 |
| agggagattc  | taaaagaacc  | agtacatggg  | gcatattatg  | acccatcaaa  | agacttaata  | 1440 |
| gcagaaatac  | agaagcaagg  | gcaagggtcaa | tggacatatc  | aaatatatca  | agagccacat  | 1500 |
| aaaaatctga  | aaacagggaa  | gtatgcaaga  | accagatctg  | cccacactaa  | tgatgttaga  | 1560 |
| caattaacag  | aagcagtgca  | aaagatagcc  | atggaatgca  | tagtaatatg  | gggaaagact  | 1620 |
| cctaagttta  | gattacccat  | acaaaaggaa  | acatgggaca  | catggtggac  | agaatattgg  | 1680 |
| caggccacct  | ggatccctga  | atgggaattt  | gtcaataccc  | ctcctctagt  | aaaattatgg  | 1740 |
| taccagttag  | aaacagaccc  | catagcagga  | gcagaaaactt | tctatgtaga  | tggggcagct  | 1800 |
| aatagagaaa  | caaaacaggg  | aaaagcagga  | tatgttactg  | atagaggcag  | acaaaaagtt  | 1860 |
| gtctccctat  | ctgaaacaac  | aaatcagaag  | actgaattac  | aagcaattta  | cttagctttg  | 1920 |
| caggattcag  | gatcagaagt  | aaacatagta  | acagactcac  | agtatgcaat  | aggaatcatt  | 1980 |
| caagcacaac  | cagatagaag  | tgaatcagat  | ttagttaatc  | aaataataga  | gcagttaata  | 2040 |
| cggaaggaca  | aggtctacct  | gtcatgggta  | ccagcacaca  | aagggattgg  | aggaaatgaa  | 2100 |
| caagtagata  | aattagtcag  | caatggaatc  | agaaagggtgc | tattttttaga | tggaatagat  | 2160 |
| aaggctcaag  | aagaacatga  | gaaatatcac  | aataactgga  | gagcaatggc  | tagtgattttt | 2220 |
| aatctgccat  | cagtggtagc  | aaaagagata  | gtagctagct  | gtaataaatg  | tcagctaaaa  | 2280 |
| ggggaagcca  | tgcattggaca | agtggactgt  | agtccaggga  | tatggcagtt  | agattgtaca  | 2340 |
| catttgaag   | gtaaagttaa  | catggtagca  | gttcatgtgg  | ctagtggata  | catagaagca  | 2400 |
| gaagttatcc  | cagcagaaac  | aggacaggaa  | acagcctact  | tcatactaaa  | attagcagga  | 2460 |
| agatggccag  | tgaaaatgat  | acatgcagac  | aacggcccca  | atttcaccag  | tgctgcgggt  | 2520 |
| aaggcagcct  | gttgggtggc  | agatatcaac  | caggaatttg  | gaattcccta  | caatccccaa  | 2580 |
| agccaaggag  | tagtggaatc  | tatgaataaa  | gaattaaaga  | aaatcatagg  | gcagggtcagg | 2640 |
| gatcaagctg  | aacaccttaa  | gacagcagta  | cagatggcag  | tattcattca  | caatttttaa  | 2700 |
| agaaaagggg  | ggattggggg  | gtacagtgca  | ggggaaagaa  | taatagacat  | aatagcatca  | 2760 |
| gatatacaaa  | ctaaagaact  | acaaaaacaa  | attacaaaaa  | ttcaaaattt  | tcgggtttat  | 2820 |
| tacaggggaca | gcagagaacc  | aattttggaag | ggaccagcaa  | aactactctg  | gaaagggtgaa | 2880 |

ggggcagtag taatacagga caacagtgat atcaaagtag taccaagaag aaaagcaaag 2940  
 attattaggg actatggcaa acagatggca ggtaatgatt gtgtggcagg tagacaggat 3000  
 gaagattag 3009

<210> 66  
 <211> 579  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

<220>  
 <223> isolate=94CT032.3; gene=vif

<400> 66  
 atggcaaaca gatggcaggt aatgattgtg tggcaggtag acaggatgaa gattagaaca 60  
 tggaacagtc tagtgaaaca tcatatgtat gtttcaaaga aagctaaagg atgattctat 120  
 agacatcact atgaaagtag gcacccaaaa gtaagttcag aagtacatat cccactaggg 180  
 gaggctagat tagtagtaag aacatattgg ggtctgcagc caggggaaca agactggcac 240  
 ttgggtcatg gagtctccat agaatggagg ctccagaagat atagcacaca agtggatcct 300  
 gacctggcag accaactaat tcatatgcat tacttttgatt gtttttcaga atctgccata 360  
 aggaaagcca tattaggaca tagagttagt cctaggtgtg aatatcaagc aggacataat 420  
 aaggtaggat cttacaata cctggcacta gcagcattaa tatcccaaaa aaagacaaaag 480  
 ccacctttgc ctagtgttaa gaaactagtg gaggatagat ggaacaagcc ccagaagacc 540  
 aggggccgca gagagaacca aataatgaat ggacactag 579

<210> 67  
 <211> 288  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

<220>  
 <223> isolate=94CY032.3; gene=vpr

<400> 67  
 atggaacaag cccagaaga ccaggggccg cagagagaac caaataatga atggacacta 60  
 gagcttttgg aggagcttaa aaatgaagct gttaggcatt ttccctagacc ctggctccat 120  
 ggcctaggac agcatatcta taacacttat ggagatacct gggaaggggt tgaagctata 180  
 ataagaatth tgcaacaact actgtttatt catttcagaa ttgggtgcca acatagtaga 240  
 ataggcatta ctctcaaag gagaagaggc aggggatgga gccagtag 288

<210> 68  
 <211> 2643  
 <212> DNA  
 <213> Human immunodeficiency virus type 1

<220>  
 <223> isolate=94CT032.3; gene=tat

<400> 68

|             |             |             |            |            |            |      |
|-------------|-------------|-------------|------------|------------|------------|------|
| atggagccag  | tagatcctga  | cctagagccc  | tggaaccatc | cggaagtca  | gcctacaact | 60   |
| gattgtaaca  | agtgtttctg  | taaaaagtgt  | tgctggcatt | gccaagtttg | ctttctgaaa | 120  |
| aaaggcttag  | gcatctccta  | tggcaggaag  | aagcggaac  | atcgacgagg | atctcttcaa | 180  |
| ggcagcaagg  | gccatcaaaa  | tcttatacca  | aagcagtaag | tattaagtat | atgtaatgtt | 240  |
| attctgggaa  | atctgggcaa  | tagtaggact  | ggtagtagcg | ctaattatag | taatagtagt | 300  |
| gtggacttta  | gtatttatag  | aatataagaa  | attgagaagg | caaaggagaa | tagacagctt | 360  |
| gtacaataga  | ataagagaaa  | gagcagaaga  | cagtggcaat | gagagtgatg | gggatgcaga | 420  |
| ggaattatcc  | acacttggtg  | gaatggggaa  | ctttgatcct | tgggttggtg | ataatctgta | 480  |
| gtgcctcaaa  | caacttggtg  | gtcacagttt  | attatggggg | acctgtgtgg | agagacgcag | 540  |
| agaccaccct  | atcttggtgca | tcagaagcta  | aagcatatga | gaaagaagta | cataatatct | 600  |
| gggctacaca  | tgctgtgta   | cccacagacc  | ccaaccaca  | agaagtagct | ctgataaatg | 660  |
| taacagagaa  | ctttaacatg  | tggaaaaatg  | acatggtaga | acagatgcat | gaggatataa | 720  |
| tcagtttatg  | gaatgaaggc  | ctaaaacat   | gtgcaaagct | aacctctctc | tgtgttactt | 780  |
| ttacatgtat  | taatgcaact  | actactaata  | gtaccaatgg | cactgtgatt | aaagaaggaa | 840  |
| taaaaaactg  | ctctttcgat  | ataaccacag  | aaataaggga | taagaagaag | aaagaatatg | 900  |
| cgcttttcta  | tagaattgat  | atagtgccaa  | ttaatgctag | agtgccaat  | aatggtagta | 960  |
| ataggaataa  | tagtacagaa  | gagtatatgt  | taataaattg | taacgcctca | accattaaac | 1020 |
| aggcttgccc  | aaaggtgtct  | tttgagccaa  | ttcccataca | ttattgtgcc | ccagctgggt | 1080 |
| ttgcaatttt  | aaagtgtaat  | gagaaaaatt  | tcactggatt | agggccatgc | acaatgtca  | 1140 |
| gctcggtagc  | atgcactcat  | ggaattaagc  | cagtggatc  | aactcaattg | ctgttaaagt | 1200 |
| gaagcttagc  | aacggaagag  | gtagtaatta  | gatctaaaaa | tatcacagac | aatacaaaaa | 1260 |
| atataatagt  | acagcttgca  | aaggctgtaa  | aaattaattg | taccagacct | ggcaacaata | 1320 |
| caagaaaaag  | tgtacatata  | gggccaggac  | taacatggta | tgcaacaggt | gaaataatag | 1380 |
| gagatataag  | acaagcacat  | tgtaacatta  | gtggaaatga | ttggaatgac | accttaaaag | 1440 |
| tgataagtga  | agaattgaaa  | agactcttcc  | ctaataaaac | aataaaattt | gctccacccg | 1500 |
| taggagggga  | cctagaaatt  | acaacacata  | gctttaattg | taaaggagaa | tttttctatt | 1560 |
| gcaatacaac  | accactgttt  | aatagtacac  | acatgcaaaa | tggtagaaa  | attacaagta | 1620 |
| cagattctac  | aaattcaacc  | atcacactcc  | aatgcagact | aaaacaattt | gtaaggatgt | 1680 |
| ggcaggaagt  | ggggcaagca  | atgtacgcct  | ccccattgc  | aggagcatt  | aactgcagct | 1740 |
| cagatattac  | aggaataata  | ttgacaagag  | atggtggtac | taataatact | gagatcttca | 1800 |
| gacctggagg  | aggagacatg  | agggacaatt  | ggagaagtga | actatataaa | tataaagtag | 1860 |
| taaagattga  | accaatagga  | gtagcaccca  | ataaggcaag | gagacgagt  | gtgcagagag | 1920 |
| aaaaatgagc  | agtggggaata | ggggccatgt  | tccttggtt  | cttgggagca | gcaggaagca | 1980 |
| ctatgggagc  | agcgtcaatg  | acgctgacgg  | tacaggccag | acaattattg | tccggcatag | 2040 |
| tgcagcagca  | gagcaatttg  | ctgagggtca  | tagagggtca | acaacatctg | ttgagactca | 2100 |
| cggtctgggg  | cattaaacag  | ctccaggcaa  | gagtcctggc | tctggaaagc | tacctaaagg | 2160 |
| atcaacagct  | cctaggaatt  | tggggctgct  | ctggaaaact | catctgcacc | actaatgtac | 2220 |
| cttggaactc  | tagttggagt  | aataaatctt  | ataatgatat | atgggacaat | atgacctggt | 2280 |
| tgcaatggga  | taaagaaatt  | aacaattaca  | cacaaataat | atatgggtta | cttgaagaat | 2340 |
| cacagaacca  | gcaggaaaag  | aatgagcaag  | acttattggc | cttggacaag | tgggcaagcc | 2400 |
| tgtggaattg  | gttttagcata | acaaaatggc  | tatggtatat | aaaaatattt | ataatgatag | 2460 |
| taggaggctt  | gataggctta  | agaataattt  | ttgctgtgct | ttctatagta | aatagagtta | 2520 |
| ggcagggtata | ctcacctttg  | tctttgcaga  | cccttatccc | aacaacccaa | cggggactcg | 2580 |
| acaggccccg  | aggaacagaa  | gaagaagggtg | gcgagcaaga | cagaagcaga | tccattcgct | 2640 |
| tag         |             |             |            |            |            | 2643 |

<210> 69

<211> 2688

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CT032.3; gene=rev

<400> 69

```
atggcaggaa gaagcggaaa catcgacgag gatctcttca aggcagcaag ggccatcaaa 60
atcttataacc aaagcagtaa gtattaagta tatgtaatgt tattctggga aatctgggca 120
atagtaggac tggtagtagc gctaattata gtaatagtag tgtggacttt agtatttata 180
gaatataaga aattgagaag gcaaaggaga atagacagct tgtacaatag aataagagaa 240
agagcagaag acagtggcaa tgagagtgat ggggatgcag aggaattatc cacacttggtg 300
ggaatgggga actttgatcc ttgggttggt gataatctgt agtgcctcaa acaacttggtg 360
ggtcacagtt tattatgggg tacctgtgtg gagagacgca gagaccaccc tattttgtgc 420
atcagaagct aaagcatatg agaaagaagt acataatatc tgggctacac atgcctgtgt 480
accacagac cccaaccac aagaagtagc tctgataaat gtaacagaga actttaacat 540
gtggaaaaat gacatggtag aacagatgca tgaggatata atcagtttat ggaatgaagg 600
cctaaaacca tgtgcaaagc taacctctct ctgtgttact ttacatgta ttaatgcaac 660
tactactaat agtaccaatg gcaactgtgat taaagaagga ataaaaaact gctctttcga 720
tataaccaca gaaataaggg ataagaagaa gaaagaatat gcgcttttct atagaattga 780
tatagtgcc attaatgcta gagtgccaat taatggtagt aataggaata atagtacaga 840
agagtatatg ttaataaatt gtaacgcctc aaccattaaa caggcttgcc caaagggtgc 900
ttttgagcca attcccatc attattgtgc ccagctggt tttgcaattt taaagtgtaa 960
tgagaaaaat ttcactggat tagggccatg cacaaatgtc agctcggtac gatgcactca 1020
tggaattaag ccagtgggtat caactcaatt gctgttaaat ggaagcttag caacggaaga 1080
ggtagtaatt agatctaaaa atatcacaga caataccaaa aatataatag tacagcttgc 1140
aaaggctgta aaaattaatt gtaccagacc tggcaacaat acaagaaaaa gtgtacatat 1200
agggccagga ctaacatggt atgcaacagg tgaaataata ggagatataa gacaagcaca 1260
ttgtaacatt agtggaatg attggaatga caccttaaaa gtgataagtg aagaattgaa 1320
aagactcttc cctaataaaa caataaaatt tgctccaccc gtaggagggg acctagaaat 1380
tacaacacat agctttaatt gtaaaggaga atttttctat tgcaatacaa caccactgtt 1440
taatagtaca cacatgcaaa atggtacaaa cattacaagt acagattcta caaattcaac 1500
catcacactc caatgcagac taaaacaatt tgtaaggatg tggcaggaag tggggcaagc 1560
aatgtacgcc tccccattg caggagcat taactgcagc tcagatatta caggaataat 1620
attgacaaga gatggtggt ctaataatac tgagatcttc agacctggag gaggagacat 1680
gagggacaat tggagaagt aactatataa atataaagta gtaaagattg aaccaatagg 1740
agtagcacc aataaggcaa ggagacgagt ggtgcagaga gaaaaatgag cagtgggaat 1800
aggggccatg ttccttgggt tcttgggagc agcaggaagc actatgggcg cagcgtcaat 1860
gacgctgacg gtacaggcca gacaattatt gtccggcata gtgcagcagc agagcaattt 1920
gctgagggct atagaggctc aacaacatct gttgagactc acggtctggg gcattaaaca 1980
gctccaggca agagtcctgg ctctggaaag ctacctaaag gatcaacagc tcctaggaat 2040
ttggggctgc tctggaaaac tcatctgcac cactaatgta ccttggaaact ctagttaggag 2100
taataaatct tataatgata tatgggacaa tatgacctgg ttgcaatggg ataaagaaat 2160
taacaattac acacaaataa tatatgggtt acttgaagaa tcacagaacc agcaggaaaa 2220
gaatgagcaa gacttattgg ccttggacaa gtgggcaagc ctgtggaatt ggttttagcat 2280
aacaaaatgg ctatggtata taaaaatatt tataatgata gtaggaggct tgataggctt 2340
aagaataatt tttgctgtgc tttctatagt aaatagagtt aggcagggat actcacctt 2400
gtctttgcag acccttatcc caacaacca acggggactc gacaggcccc gaggaacaga 2460
```



agaagaaggt ggcgagcaag acagaagcag atccattcgc ttagtgaacg gattcttgcc 2520  
acttatctgg gacgacctgc ggaacctgtg cctcttcagc taccgccact tgagaaactt 2580  
actcttaatt gtagcgagga ctgtggaact tctggggata agggggtggg aagccctcaa 2640  
gtatctgtgg aacttcctgc tgtattgggg acaggagcta aagaatag 2688

<210> 70

<211> 246

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CT032.3; gene=vpu

<400> 70

atgttattct gggaaatctg ggcaatagta ggactggtag tagcgctaata tatagtaata 60  
gtagtgtgga ctttagtatt tatagaatat aagaaattga gaaggcaaag gagaatagac 120  
agcttgatca atagaataag agaaagagca gaagacagtg gcaatgagag tgatggggat 180  
gcagaggaat tatccacact tgtgggaatg gggaaacttg atccttggtg tggtgataat 240  
ctgtag 246

<210> 71

<211> 2571

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CY032.3; gene=env

<400> 71

atgagagtga tggggatgca gaggaattat ccacacttgt gggaatgggg aactttgatc 60  
cttggttgg tgataatctg tagtgccca aacaacttgt gggtcacagt ttattatggg 120  
gtacctgtgt ggagagacgc agagaccacc ctatcttctg catcagaagc taaagcatat 180  
gagaaagaag tacataatat ctgggtctaca catgcctgtg taccacaga cccaaccca 240  
caagaagtag ctctgataaa tgtaacagag aactttaaca tgtggaaaaa tgacatggta 300  
gaacagatgc atgaggatat aatcagttta tgggaatgaag gcctaaaacc atgtgcaaag 360  
ctaactctc tctgtgttac ttttacatgt attaatgcaa ctactactaa tagtaccat 420  
ggcactgtga ttaaagaagg aataaaaaac tgctctttcg atataaccac agaaataagg 480  
gataagaaga agaaagaata tgcgcttttc tatagaattg atatagtgcc aattaatgct 540  
agagtgccaa ttaatggtag taataggaat aatagtacag aagagtatat gttaataaat 600  
tgtaacgct caaccattaa acaggcttgc ccaaagggtg cttttgagcc aattcccata 660  
cattattgtg cccagctgg ttttgcaatt ttaaagtgt atgagaaaaa tttcactgga 720  
ttagggccat gcacaaatgt cagctcggtg cgatgcactc atggaattaa gccagtggta 780  
tcaactcaat tgctgttaaa tgggaagctta gcaacggaag aggtagtaat tagatctaaa 840  
aatatcacag acaataccaa aaatataata gtacagcttg caaaggctgt aaaaattaat 900  
tgtaccagac ctggcaacaa tacaagaaaa agtgtacata tagggccagg actaacatgg 960  
tatgcaacag gtgaaataat aggagatata agacaagcac attgtaacat tagtggaaat 1020  
gattggaatg acaccttaaa agtgataagt gaagaattga aaagactctt ccctaataaa 1080  
acaataaaat ttgctccacc cgtaggaggg gacctagaaa ttacaacaca tagctttaat 1140

|             |             |            |             |            |             |      |
|-------------|-------------|------------|-------------|------------|-------------|------|
| tgtaaaggag  | aatTTTTtcta | ttgcaataca | acaccactgt  | ttaatagtac | acacatgcaa  | 1200 |
| aatggtacaa  | acattacaag  | tacagattct | acaaattcaa  | ccatcacact | ccaatgcaga  | 1260 |
| ctaaaacaat  | ttgtaaggat  | gtggcaggaa | gtggggcaag  | caatgtacgc | ctccccatt   | 1320 |
| gcaggaggca  | ttactgcag   | ctcagatatt | acaggaataa  | tattgacaag | agatggtggt  | 1380 |
| actaataata  | ctgagatctt  | cagacctgga | ggaggagaca  | tgagggacaa | ttggagaagt  | 1440 |
| gaactatata  | aatataaagt  | agtaaagatt | gaaccaatag  | gagtagcacc | caataaggca  | 1500 |
| aggagacgag  | tgggtgcagag | agaaaaatga | gcagtgggaa  | taggggccat | gttccttggg  | 1560 |
| ttcttgggag  | cagcaggaag  | cactatgggc | gcagcgtcaa  | tgacgctgac | ggtacaggcc  | 1620 |
| agacaattat  | tgtccggcat  | agtgcagcag | cagagcaatt  | tgctgagggc | tatagaggct  | 1680 |
| caacaacatc  | tgttgagact  | cacggtctgg | ggcattaaac  | agctccaggc | aagagtccctg | 1740 |
| gctctggaaa  | gctacctaaa  | ggatcaacag | ctcctaggaa  | tttggggctg | ctctggaaaa  | 1800 |
| ctcatctgca  | ccactaatgt  | accttggaac | tctagttaga  | gtaataaatc | ttataatgat  | 1860 |
| atatggggaca | atatgacctg  | gttgcaatgg | gataaagaaa  | ttaacaatta | cacacaaata  | 1920 |
| atatatgggt  | tacttgaaga  | atcacagaac | cagcaggaaa  | agaatgagca | agacttattg  | 1980 |
| gccttgagaca | agtgggcaag  | cctgtggaat | tggttttagca | taacaaaatg | gctatggtat  | 2040 |
| ataaaaaatat | ttataatgat  | agtaggaggc | ttgataggct  | taagaataat | ttttgctgtg  | 2100 |
| ctttctatag  | taaatagagt  | taggcaggga | tactcacctt  | tgtctttgca | gacccttatc  | 2160 |
| ccaacaacc   | aacggggact  | cgacaggccc | ggaggaacag  | aagaagaagg | tggcgagcaa  | 2220 |
| gacagaagca  | gatccattcg  | cttagtgaac | ggattcttgc  | cacttatctg | ggacgacctg  | 2280 |
| cggaaacctgt | gcctcttcag  | ctaccgccac | ttgagaaact  | tactcttaat | tgtagcgagg  | 2340 |
| actgtggaac  | ttctggggat  | aagggggtgg | gaagccctca  | agtatctgtg | gaacttcctg  | 2400 |
| ctgtattggg  | gacaggagct  | aaagaatagt | gctattaatt  | tgtttaatac | cacagcaata  | 2460 |
| gcagtagctg  | agggaacaga  | taggattata | gaagcagtac  | agagagcttg | tagagctatt  | 2520 |
| tgcaacatac  | ctagaagaat  | cagacagggc | cttgaaagag  | ctttgcttta | a           | 2571 |

<210> 72

<211> 660

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> nef

<400> 72

|            |             |            |            |            |            |     |
|------------|-------------|------------|------------|------------|------------|-----|
| atgggaggca | aatggtcaaa  | aagtagcata | gttggtggc  | ctgagataag | ggaaagaatg | 60  |
| aggcgagctc | gagctgagcc  | agaaagaatg | aggcgagctc | aagctgagcc | agcagcagca | 120 |
| ggagtaggag | cagtgtctca  | agacttggac | aaacatgggg | caatcacaat | taacaataca | 180 |
| gcagctacta | atcctgacaa  | aacctggctg | gaagcacaa  | aagaggaaga | agaggtaggt | 240 |
| tttccagtca | ggccacaggt  | acctttaagg | ccaatgacct | ttaaaggagc | tttagatctc | 300 |
| agccactttt | taaaagaaaa  | ggggggactg | gatgggctaa | tttactccaa | gaaaagacaa | 360 |
| gagatccttg | atctgtgggt  | ctatcacaca | caaggtttct | tccctgattg | ggataactac | 420 |
| acaccaggac | caggggagag  | attccactg  | tgctttggat | ggtgcttcaa | gctagtacca | 480 |
| gtagatccac | aggagggtgga | agaggccact | gaaggagaga | acacctgttt | gctgcaccct | 540 |
| ataagccagc | atggaatgga  | ggatgaagag | agagaagtat | taaagtggaa | gtttgacagt | 600 |
| cgcctggcat | acaagcacgt  | agcccagag  | ctgcatccgg | agttttacaa | agactgctga | 660 |

<210> 73

<211> 1485

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM651.8; gene=gag

<400> 73

```
atgggtgcga gagcgtcaat attaagaggg ggaaaattag ataaatggga aaaaattagg 60
ctaaggccag ggggaaagaa acgctatatg ataaaacacc tagtatgggc aagcagggag 120
ctggaaagat ttgcgcttaa ccctggcctt ttagaaacat cagaaggctg taaacaaata 180
atgaaacagc tacaaccagc tcttcagaca ggaacggagg aacttagatc attatacaac 240
acagtagcaa ctctctattg tgtacatgaa ggggtagagg tacgagacac caaggaagcc 300
ttagacagga tagaggaaga acaaaacaaa attcagcaaa aaatacagca aaaaacacag 360
caagcggtcg acggaaaggt cagtcaaaat tctctatag tgcagaatct ccaagggcaa 420
atggtagacc agaaactatc acctagaact ttgaatgcat gggtaaaagt aatagaagaa 480
aaagctttta gccagaggtt aatacccatg tttacagcat tatcagaagg agccacccca 540
caagatttaa acaccatgtt aaatacagtg gggggacatc aagcagccat gcaaatgtta 600
aaagatacta tcaatgagga ggctgcagaa tgggtagatg tacatccagt gcatgcaggg 660
cctattgcac caggccaaat gagagaacca aggggaagtg atatagcagg aactactagt 720
accctccaag aacagatagc atggatgaca agtaatcccc ctattccagt gggagacatc 780
tataaaagat ggataattct ggggttaaat aaaatagtaa gaatgtatag ccctgtcagc 840
attttgagca taaaacaagg gccaaaggaa ccctttagag actatgtaga ccggttcttc 900
aaaactttta gagctgaaca ggctacacaa gaagtaaaaa attggatgac agacaccttg 960
ttggtccaaa atgcaaacc agattgcaag accattttta aagcattagg accaggggct 1020
acattagaag aaatgatgac agcatgtcaa ggagtgggag gacctagcca caaagcaaga 1080
gtgttggtcg aggcaatgag ccaaacaaat agtgtaaaca tactgatgca gaaaagcaat 1140
tttaaaggaa ataaaagaat ggtaaattgt ttaactgtg gtaagggaagg gcacatagcc 1200
agaaattgca gggcccctag gaaaaagggc tggttgaaat gtggaaagga gggacaccaa 1260
atgaaagact gtactgagag gcaggctaatt tttttaggga aaatttgcc ttcccacaag 1320
ggaaggccag ggaatttcct tcagaacagg ccagagccaa cagccccacc agcagagagc 1380
ttcaggttcg aggagacaac ccccgctccg aagcaggagt cgaaagacag ggaagcctta 1440
acttcctca aatcactctt tggcagcgac ccctgtctc aataa 1485
```

<210> 74

<211> 3000

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM651.8; gene=pol

<400> 74

```
tttttttaggg aaaatttggc cttcccacaa gggaaggcca gggaatttcc ttcagaacag 60
gccagagcca acagccccac cagcagagag cttcagggtc gaggagacaa ccccgctcc 120
gaagcaggag tcgaaagaca gggaagcctt aacttcctc aaatcactct ttggcagcga 180
ccccttgtct caataaaggt agggggccaa ataaaggagg ctctcttaga cacgggagca 240
ggtgatacag tattagaaga aataaatttg ccaggcaaat ggaaaccaa aatgatagga 300
ggaattggag gctttatcga agtaagacaa tatgatcaaa tacctatgga aatttgtagga 360
```

aaaaaggcta taggtacagt attagtagga cctacacctg tcaacataat tggaagaaat 420  
atgttgactc agcttgatg cactactaat tttccaatta gtctattga aactgtacca 480  
gtaaaattaa agccaggaat ggatggccca aagggtaaac aatggccatt gacagaagag 540  
aaaataaaaag ctttaacagc aatttgtgaa gaaatggaga aggaaggaaa aattacaaaa 600  
attgggcctg aaaatccata taacactcca gtatttgcca taaaaaagaa ggacagtact 660  
aagtggcgaa aattagtaga tttcagggaa ctcaataaaa gaactcaaga cttttgggaa 720  
gttcaattag gaataccaca cccagcaggg ttaaaaaaga aaaaatcagt gacagtactg 780  
gatgtggggg atgcatattt ttcagttcct ttagatgaaa gcttcaggaa atatactgca 840  
ttcaccatac ctagtacaaa caatgaaaca ccagggatta gatatcaata taatgtgctt 900  
ccacagggat ggaaaggatc accagcaata ttccagagta gcatgacaaa aatcttagag 960  
cccttcaggg cacaaaatcc agacatagtc atctatcaat atatggatga cctgtatgta 1020  
ggatctgact tagaaatagg gcaacataga gcaaaaatag aagagttaag agaactcta 1080  
ttaaagtggg gatttaccac accagacaag aaacatcaga aagaaccccc atttctttgg 1140  
atggggtatg aactccatcc tgacaaatgg acagtacagc ctatacagct ggcagaaaaa 1200  
gatagctgga ctgttaatga tatacagaag ttagtgggaa aattaaactg ggcaagtcag 1260  
atttacgcag ggattaaagt aaggcaactt tgtaaactcc ttaggggagc caaagcacta 1320  
acagacatag taccactaac tgaagaagca gaattagaat tggcagagaa caaggaaatt 1380  
ttaaaagaac cagtacatgg ggtatattat gacctatcaa aagacttgat agctgaaata 1440  
cagaaacaag ggcattgacca atggacatat caaatttacc aggaaccatt caaaaatctg 1500  
aaaacaggga agtatgcaaa aatgaggaca gccacacta atgatgtaaa acagttaaca 1560  
gaggcagtcg aaaaaatagc cctggagagc atagtaatat ggggaaagat tcctaaattt 1620  
agactacca tccaaaaaga aacatgggaa acatgggtga cagactattg gcaagccacc 1680  
tggtattcctg agtgggagtt tgttaatacc cctctcttag taaaattatg gtaccagctg 1740  
gagaaagaac ccatagtagg agcagaaacc ttctatgtag atggagcagc caatagggaa 1800  
actaaattag gaaaagcagg gtatattact gacagaggaa ggcaaaaaat tgttactcta 1860  
actgaaacaa caaatcagaa gactgaatta caagcaattt acctagcttt gcaagattca 1920  
ggatcagaag taaacatagt aactgactca cagtatgcgt taggaatcat tcaagcacat 1980  
ccagataaga gtgaatcaga gttagtcaac caaataatag aacaattaat aaagaaggaa 2040  
agggctctacc tgtcatgggt accagcacat aaaggaattg gaggtaatga acaggtagat 2100  
aaattagtaa gcaagggaat caggaaagtg ctgtttctag atggaataga caaggctcaa 2160  
gaagagcatg aaaaatatca caacaattgg agagcaatgg ctagtgaatt taatctacca 2220  
ccagtagtag caaaagaaat agtagctagt tgtgataaat gtcagcaaaa aggggaagcc 2280  
acacatggac aagtagactg tagtccaggg atatggcaat tagactgtac acatttagaa 2340  
ggaaaaatca tcttggtagc agtccatgta gccagtggct acatagaagc agagggtatc 2400  
ccagcagaaa caggacaaga aacagcatac tatatattaa aattagcagg aagatggcca 2460  
gtcaaagtaa tacatacaga caatggtagc aattttacca gtgctgcagt taaggcagcc 2520  
tgttggtggg caggatatcaa acaagaattt ggaattccct acaatccaca aagtcaggga 2580  
gtagtagaat ccatgaataa agaattaaag aaaatcatag ggcaggtaag agatcaggct 2640  
gagcatctta aaacagcagt acaaatggca gtattcattc acaattttta aagaaaaagg 2700  
gggattgggg ggtacagtgc aggggaaaga ataatagaca taatagcaac agacatacaa 2760  
acaaagaac taaaaaaca aattataaac attcaaaaat ttcgggttta ttacagagac 2820  
agcagagacc ccatattggaa aggaccagcc aaactactct ggaaagggtga aggggcagta 2880  
gtaatacaag ataatagtga cataaaagtg gtaccaagga ggaaagcaaa aatcattagg 2940  
gactatggaa aacagatggc aggcgctgat tgtgtggcag gtagacagga tgaggattag 3000

<210> 75

<211> 579

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM651.8; gene=vif

<400> 75

```
atggaaaaca gatggcaggc gctgattgtg tggcaggtag acaggatgag gattagaaca 60
tggaatagtt tagtaaagca ccatatgtat atttcacgga aagctaattg atggttttac 120
agacatcatt atgaaagcag acatccaagg gtaagttcag aagtacatat cccattaggg 180
gatgctaaat tagtaataaa aacatatttg ggtttgcaaa caggagaaaag agattggcat 240
ttgggtcatg gagtctccat agaatggaga ttgagaagat atagcacaca agtagaccct 300
ggcctggcag accagctaatt tcatatgcac tattttgatt gttttgcaga ctctgccata 360
agaaaagcca tattaggaca catagttatt cctaggtgtg actatcaagc aggacataat 420
aaggtaggat ctctgcaata cttggcactg acagcattga taaaaccaa aaagagaaaag 480
ccacctctgc ctagtgttag gaaattagta gaggatagat ggaacaattc ccagaagacc 540
aagggccgca gagggaacca tacagtgagt ggacactag 579
```

<210> 76

<211> 291

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM651.8; gene=vpr

<400> 76

```
atggaacaat tcccagaaga ccaagggccg cagaggggaac catacagtga gtggacacta 60
gagattctag aggaactcaa gcaggaagct gtcagacact ttcctagacc atggctccat 120
agcttaggac aacatatcta tgaaacttat ggggatactt ggactggagt cgaggctata 180
ataagaatac tgcaacaact actgtttatt catttcagaa ttgggtgccg gcacagcaga 240
ataggcatgg ttcgacagag aagagcgaga aatggagcca gtagatccta g 291
```

<210> 77

<211> 2666

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM651.8; gene=tat

<400> 77

```
atggagccag tagatcctag catagagccc tggaaaccatc caggaagtca gcctaaaact 60
gcttgtaata agtgttattg caaacgctgt agctatcatt gtctagtttg ctttcagaca 120
aaaggcttag gcatttcata tggcaggaag aagcggagac agcgacgcag cactcctcct 180
agcagcgagg accatcaaga tcctatatca aagcagtaag tatatgtaat gtttagattta 240
ctagcaagag taaattatag agtaggagta ggagcattga tagtagcact actcatagca 300
atagttgtgt ggaccatagc atatatagaa tataggaagc tgtaagaca aagaaaaata 360
gactggttaa ttaaaagaat tagggaaaga gcagaagaca gtggcaatga gagtgaggga 420
```

```

gatactgagg aattggcaac gatggtggac atggggcatc ttaggctttt ggatgttaat 480
gatttgtaat gtgtggggga acttgtgggt cacagtctat tatgggggtac ctgtgtggaa 540
agaagcaaaa actactctat tctgtgcatc agatgctaaa tcatatgaga aagaagtgca 600
taatgtctgg gctacacatg cctgtgtacc cacagacccc aaccacacaag aaatagtttt 660
gggaaatgta acagaaaatt ttaacatgtg gaaaaatgac atggtggatc agatgcatga 720
ggatataatc agtttatggg atcaaagcct aaagccatgt gtaaagttga cccactctg 780
tgctacttta aattgtacag aggttaatgt taccagaaat gttaataata gcgtgggttaa 840
taataccaca aatgttaata atagcatgaa tggagacatg aaaaattgct ctttcaacat 900
aaccacagaa ctaaaagata agaaaaagaa tgtgtatgca cttttttata aacttgatat 960
agtatcactt aatgagactg acgactctga gactggcaac tctagtaaat attatagatt 1020
aataaattgt aatacctcag ccctaacaca agcctgtcca aaggtctctt ttgacccaat 1080
tcctatacat tattgtgctc cagctgggta tgcgattcta aagtgttaata ataagacatt 1140
caatgggaca ggaccatgcc ataatgtcag cacagtacaa tgtacacatg gaattaagcc 1200
agtggatatca actcaactac tgttaaattg tagcctagca gaagaaggga taataattag 1260
atctgaaaat ctgacaaaca atgtcaaaac aataatagta catcttaata gatctataga 1320
aattgtgtgt gtaagaccca acaataatac aagacaaagt ataagaatag gaccaggaca 1380
aacattctat gcaacaggag acataatagg agacataaga caagcacatt gtaacattag 1440
taggactaac tggactaaga ctttacgaga ggtaaggaaac aaattaagag aacacttccc 1500
taataaaaaac ataacattta aaccatctc aggaggggac ctagaaatta caacacatag 1560
ctttaattgt agaggagaat ttttctattg caatacatcg ggctgttta gtataaatta 1620
tacagaaaat aatacagatg gtacacccat cacactccca tgcagaataa gacaaattat 1680
aaatatgtgg caggaagtag gacgagcaat gtacgcccct ccattgaag gaaacatagc 1740
atgtaaatca gatatcacag ggctactatt ggctcgggat ggaggaagca caaatgatag 1800
cacaaataat aacacagaga tattcagacc tgcaggagga gatatgaggg acaattggag 1860
gagtgaattg tataagtata aagtggtaga aattaagcca ttgggaatag caccactga 1920
ggcaaaaagg agagtgggtg agagagaaaa aagagcagtg ggaataggag ctgtgttcct 1980
tgggttcttg ggagcagcag gaagcactat gggcgagcg tcaataacgc tgacggcaca 2040
ggccagacaa gtgttgtctg gtatagtgcac acagcaaagc aatttgctga gggctataga 2100
ggcgcaacag catctgttgc aactcacggt ctggggcatt aagcagctcc agacaagagt 2160
cctggctata gaaagatacc taaaggatca acagctccta ggactttggg gctgctctgg 2220
aaaactcatc tgcaccactg ctgtgccttg gaacatcagt tggagtaata aatctaaaac 2280
agatatattg gataacatga cctggatgca gtgggtaga gaaattagta attacacaaa 2340
cacaatatac aggttgcttg aggactcgca gagccagcag gagcaaaatg aaaaagattt 2400
attagcattg gacagttgga acaatctgtg gaattgggtt gacataacaa aatggctgtg 2460
gtatataaaa atatttataa tgatagtagg aggttaata ggtttgagaa taatttttgc 2520
tgtactctct atagtgaata gagttaggca gggatactca ctttgtcgt ttcagacct 2580
tatcccgaac ccaaggaac ccgacaggcc aggaagaatc gaagaagaag gtggagagca 2640
agacaaagag agatccgtgc gattag 2666

```

<210> 78

<211> 2684

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM651.8; gene=rev

<400> 78

|             |            |             |            |             |             |      |
|-------------|------------|-------------|------------|-------------|-------------|------|
| atggcaggaa  | gaagcggaga | cagcgacgca  | gcactcctcc | tagcagcgag  | gaccatcaag  | 60   |
| atcctatata  | aaagcagtaa | gtatatgtaa  | tgtagattt  | actagcaaga  | gtaaattata  | 120  |
| gagtaggagt  | aggagcattg | atagtagcac  | tactcatagc | aatagttgtg  | tggaccatag  | 180  |
| catatataga  | atataggaag | ctgttaagac  | aaagaaaaat | agactgggta  | attaaaagaa  | 240  |
| ttagggaag   | agcagaagac | agtggcaatg  | agagtgaagg | agatactgag  | gaattggcaa  | 300  |
| cgatgggtga  | catggggcat | cttaggcttt  | tgtaggttaa | tgatttgtaa  | tgtgtggggg  | 360  |
| aacttgtggg  | tcacagtcta | ttatggggta  | cctgtgtgga | aagaagcaaa  | aactactcta  | 420  |
| ttctgtgcat  | cagatgctaa | atcatatgag  | aaagaagtgc | ataatgtctg  | ggctacacat  | 480  |
| gcctgtgtac  | ccacagaccc | caaccacaa   | gaaatagttt | tgggaaatgt  | aacagaaaat  | 540  |
| tttaacatgt  | ggaaaaatga | catgggtggat | cagatgcatg | aggatataat  | cagtttatgg  | 600  |
| gatcaaagcc  | taaagccatg | tgtaaagttg  | acccactct  | gtgtcacttt  | aaattgtaca  | 660  |
| gaggttaatg  | ttaccagaaa | tgtaataaat  | agcgtgggta | ataataccac  | aatgttaat   | 720  |
| aatagcatga  | atggagacat | gaaaaattgc  | tctttcaaca | taaccacaga  | actaaaagat  | 780  |
| aagaaaaaga  | atgtgtatgc | acttttttat  | aaacttgata | tagtatcact  | taatgagact  | 840  |
| gacgactctg  | agactggcaa | ctctagtaaa  | tattatagat | taataaattg  | taatacctca  | 900  |
| gccctaacac  | aagcctgtcc | aaaggctctt  | tttgacccaa | ttcctataca  | ttattgtgct  | 960  |
| ccagctgggt  | atgcgattct | aaagtgtaat  | aataagacat | tcaatgggac  | aggaccatgc  | 1020 |
| cataatgtca  | gcacagtaca | atgtacacat  | ggaattaaag | cagtgggtatc | aactcaacta  | 1080 |
| ctgttaaatg  | gtagcctagc | agaagaaggg  | ataataatta | gatctgaaaa  | tctgacaaac  | 1140 |
| aatgtcaaaa  | caataatagt | acatcttaat  | agatctatag | aaattgtgtg  | tgtaagaccc  | 1200 |
| aacaataata  | caagacaaag | tataagaata  | ggaccaggac | aaacattcta  | tgcaacagga  | 1260 |
| gacataatag  | gagacataag | acaagcacat  | tgtaacatta | gtaggactaa  | ctggactaag  | 1320 |
| actttacgag  | aggtaaggaa | caaattaaga  | gaacacttcc | ctaataaaaa  | cataacattt  | 1380 |
| aaaccatcct  | caggagggga | cctagaaatt  | acaacacata | gctttaattg  | tagaggagaa  | 1440 |
| tttttctatt  | gcaatacatc | gggcctgttt  | agtataaatt | atacagaaaa  | taatacagat  | 1500 |
| ggtacaccca  | tcacactccc | atgcagaata  | agacaaatta | taaatatgtg  | gcaggaagta  | 1560 |
| ggacgagcaa  | tgtacgcccc | tcccattgaa  | ggaaacatag | catgtaaatc  | agatatcaca  | 1620 |
| gggctactat  | tggttcggga | tggaggaagc  | acaaatgata | gcacaaataa  | taacacagag  | 1680 |
| atattcagac  | ctgcaggagg | agatatgagg  | gacaattgga | ggagtgaatt  | gtataagtat  | 1740 |
| aaagtggtag  | aaattaagcc | attgggaata  | gcacccactg | aggcaaaaag  | gagagtgggtg | 1800 |
| gagagagaaa  | aaagagcagt | gggaatagga  | gctgtgttcc | ttgggttctt  | gggagcagca  | 1860 |
| ggaagcacta  | tgggcgcagc | gtcaataacg  | ctgacggcac | aggccagaca  | agtgttgtct  | 1920 |
| ggtatagtgc  | aacagcaaag | caatttgctg  | agggctatag | aggcgcaaca  | gcatctgttg  | 1980 |
| caactcacgg  | tctggggcat | taagcagctc  | cagacaagag | tcctggctat  | agaaagatac  | 2040 |
| ctaaaggatc  | aacagctcct | aggacttttg  | ggctgctctg | gaaaactcat  | ctgcaccact  | 2100 |
| gctgtgcctt  | ggaacatcag | ttggagtaat  | aaatctaaaa | cagatatattg | ggataacatg  | 2160 |
| acctggatgc  | agtgggatag | agaaattagt  | aattacacaa | acacaatata  | caggttgctt  | 2220 |
| gaggactcgc  | agagccagca | ggagcaaaat  | gaaaaagatt | tattagcatt  | ggacagttgg  | 2280 |
| aacaatctgt  | ggaattgggt | tgacataaca  | aatggctgt  | ggtatataaa  | aatatttata  | 2340 |
| atgatagtag  | gaggcttaat | aggtttgaga  | ataatttttg | ctgtactctc  | tatagtgaat  | 2400 |
| agagttaggc  | agggatactc | acctttgtcg  | tttcagaccc | ttatcccgaa  | ccaagggaa   | 2460 |
| cccagacaggc | caggaagaat | cgaagaagaa  | ggtggagagc | aagacaaaga  | gagatccgtg  | 2520 |
| cgattagtga  | gcggattctt | agcacttgcc  | tgggacgacc | tacggagcct  | gtgcctcttc  | 2580 |
| agctaccacc  | gattgagaga | cttcatattg  | gtgacagcga | gagcgggtgga | gcttctgaga  | 2640 |
| cgcagcagtc  | tcaagggact | acagaggggg  | tgggaagccc | ttaa        |             | 2684 |

<210> 79

<211> 261

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM651.8; gene=vpu

<400> 79

```
atggttagatt tactagcaag agtaaattat agagtaggag taggagcatt gatagtagca 60
ctactcatag caatagttgt gtggaccata gcatatatag aatataggaa gctgttaaga 120
caaagaaaaa tagactgggtt aattaaaaga attagggaaa gagcagaaga cagtggcaat 180
gagagtgagg gagatactga ggaattggca acgatggtgg acatggggca tcttaggctt 240
ttggatgtta atgatttgta a                                     261
```

<210> 80

<211> 2607

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM651.8; gene=env

<400> 80

```
atgagagtga gggagatact gaggaattgg caacgatggt ggacatgggg catcttaggc 60
ttttggatgt taatgatttg taatgtgtgg gggaacttgt gggtcacagt ctattatggg 120
gtacctgtgt ggaaagaagc aaaaactact ctattctgtg catcagatgc taaatcatat 180
gagaaagaag tgcataatgt ctgggctaca catgcctgtg taccacacaga cccaaccca 240
caagaaatag ttttgggaaa tgtaacagaa aattttaaca tgtggaaaaa tgacatgggtg 300
gatcagatgc atgaggatat aatcagttta tgggatcaaa gcctaaagcc atgtgtaaag 360
ttgacccac tctgtgtcac tttaaattgt acagagggtta atgttaccag aaatgttaat 420
aatagcgtgg ttaataatac cacaactgtt aataatagca tgaatggaga catgaaaaat 480
tgctctttca acataaccac agaactaaaa gataagaaaa agaattgtgtg tgcacttttt 540
tataaacttg atatagtatc acttaatgag actgacgact ctgagactgg caactctagt 600
aaatattata gattaataaa ttgtaatacc tcagccctaa cacaagcctg tccaaagggtc 660
tcttttgacc caattcctat acattattgt gctccagctg gttatgcat tctaaagtgt 720
aataataaga cattcaatgg gacaggacca tgccataatg tcagcacagt acaatgtaca 780
catggaatta agccagtggg atcaactcaa ctactgttaa atggtagcct agcagaagaa 840
gggataataa ttagatctga aaatctgaca aacaatgtca aaacaataat agtacatctt 900
aatagatcta tagaaattgt gtgtgtaaga cccaacaata atacaagaca aagtataaga 960
ataggaccag gacaaacatt ctatgcaaca ggagacataa taggagacat aagacaagca 1020
cattgtaaca ttagtaggac taactggact aagactttac gagaggtaag gaacaaatta 1080
agagaacact tccctaataa aaacataaca tttaaaccat cctcaggagg ggacctagaa 1140
attacaacac atagctttta ttgtagagga gaatttttct attgcaatac atcggggcctg 1200
tttagtataa attatacaga aaataatata gatggtacac ccatcacact cccatgcaga 1260
ataagacaaa ttataaatat gtggcaggaa gtaggacgag caatgtacgc ccctccatt 1320
gaaggaaaca tagcatgtaa atcagatatc acagggctac tattggttcg ggatggagga 1380
agcacaaatg atagcacaaa taataacaca gagatattca gacctgcagg aggagatatg 1440
agggacaatt ggaggagtga attgtataag tataaagtgg tagaaattaa gccattggga 1500
atagcaccca ctgaggcaaa aaggagagtg gtggagagag aaaaaagagc agtgggaata 1560
```



```

ggagctgtgt tccttgggtt cttgggagca gcaggaagca ctatgggagc agcgtcaata 1620
acgctgacgg cacaggccag acaagtgttg tctgggtatag tgcaacagca aagcaatttg 1680
ctgaggggcta tagaggcgca acagcatctg ttgcaactca cggctctggg cattaagcag 1740
ctccagacaa gagtcctggc tatagaaaga tacctaaagg atcaacagct cctaggactt 1800
tggggctgct ctggaaaact catctgcacc actgctgtgc cttggaacat cagttggagt 1860
aataaatcta aaacagatat ttgggataac atgacctgga tgcagtggga tagagaaatt 1920
agtaattaca caaacacaat atacagggttg cttgaggact cgcagagcca gcaggagcaa 1980
aatgaaaaag atttattagc attggacagt tggaacaatc tgtggaattg gtttgacata 2040
acaaaatggc tgtggtatat aaaaatattt ataatgatag taggaggctt aataggtttg 2100
agaataattt ttgctgtact ctctatagtg aatagagtta ggaggagata ctcacctttg 2160
tcgttttcaga cccttatccc gaacccaagg gaacccgaca ggccagggaag aatcgaagaa 2220
gaagggtggag agcaagacaa agagagatcc gtgcgattag tgagcggatt cttagcactt 2280
gcctgggacg acctacggag cctgtgcctc ttcagctacc accgattgag agacttcata 2340
ttggtgacag cgagagcggg ggagcttctg agacgcagca gtctcaaggg actacagagg 2400
gggtgggaag cccttaagta tctgggaagt cttgtgcagt attgggttct ggagctaaaa 2460
aagagtgcta ttagtctact tgataccata gcaatagcag tagctgaagg aacagatagg 2520
attatagaat taatacaagg aatttgtaga gctatccgca acgtacctag aagaataaga 2580
cagggctttg aaacagcttt gctataa 2607

```

<210> 81

<211> 621

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> nef

<400> 81

```

atgggggggca agtgggtcaaa aagcagtata gttggatggc ctgctgtaag agagagaata 60
agaagaactg agccagcagc agaggaggta ggagcagcgt ctcaagactt agataaatat 120
ggagcactta caagcagcaa cacaagtacc actaatgctg cttgtgcctg gctggaagca 180
caagaggagg aagaagtggg ctttccagtc agacctcagg tgcctttaag accaatgact 240
tataaggcag cagtcgatct cagcttcttt ttaaagaaa aggggggact ggaagggtta 300
atttactcta agaaaaggca agaaatcctt gatttgtggg tctatcacac acaaggcttc 360
ttccttgact ggcaaaacta cacaccggga ccaggggtca gatatccact gacctttgga 420
tggtgcttca agctagtgcc agttgatcca ggggaagtag aagaggccaa cgaaggagaa 480
aacaactgtc tgctacacc tatgagccag caaggaatgg atgatgatca cagagaagta 540
ttaaagtgga agtttgacag tcacctagca cataaacaca tggcccgaga gctacatccg 600
gagtattaca aagactgctg a 621

```

<210> 82

<211> 1496

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM751.3; gene=gag

<400> 82

```
atgggtgcga gagcgtcaat attaagaggc ggaaaattag atgaatggga aagaattagg 60
ttaaggccag ggggaaaaaa gcactatatg atgaaacact taatatgggc aagcagggag 120
ctggaaagat ttgcacttaa ccctggcctt ttagagacat cagaaggctg taaacaaata 180
atacaacagc tacaaccagc tctccagaca ggaacagagg aacttaggtc attatataat 240
acagtagcaa ctctctattg tgtacatgaa aagataaagg tacgagacac caaggaagcc 300
ctagacaaga tagaggaaga acaaaacaaa agtcaacaaa aaatacaaaa aacagaagcg 360
actggcggaa aggtcagtc aattatcct atagtgcaga atctccaagg gcaaatggta 420
caccaggcta tatcacctag aactttgaat gcatgggtaa aagtaataga ggagaagggt 480
ttcaaccag aggtaatacc catgtttaca gcattatcag aaggagccac cccacaagat 540
ctaaacacca tgttaaatac agtgggggga catcaagcag ccatgcaa atgttaaagat 600
accatcaatg aggaagctgc agaattggat aggttacatc cagtacatgc agggcctatt 660
gcaccaggcc aaataagaga accaagggga agtgacatag caggaactac tggtagcctt 720
caggaacaaa tagcatggat gacaaataac ccacctattc cagtgggaga catctataaa 780
agatggataa ttctggggtt aaataaaata gtaagaatgt acagccctgt cagcattctg 840
gacataaaac aaggaccaa ggaacccttt agggactatg tagatcggtt ctttaaaact 900
ttaagagctg aacaagctac acaagatgta aaaattggat gacagacacc ttgttggttc 960
aaaatgcgaa cccagattgt aagaccattt taagggcatt aggaccaggg gctacattag 1020
aagaaatgat gacagcatgt caggagagtg ggggacctgg ccacaaagca agagttttgg 1080
ctgaagcaat gagccaagta aacaatacaa acataatgat gcagaaaagc aatttttaaag 1140
gccctaaaag aattgtttaa tgtttcaact gtggcaggga agggcatata gccaggaatt 1200
gcagggtctc tgggaaaaaa ggctgttgga aatgtggaaa ggaaggacac caaatgaaag 1260
actgtactga gagacaggct aatttttttag ggaaaatttg gccttcccag aaggggaggc 1320
cggggaactt ccttcagaac agaccagagc caacagcccc accagctcca acagccccac 1380
cagcagagag cttcagggtt gaggagacaa cccctgcccc gaggcaggag cagaaagaca 1440
aggaaccctt aactgcctc aaatcactct ttggcagcga ccccttgtct caataa 1496
```

<210> 83

<211> 3017

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96AM751.3; gene=pol

<400> 83

```
tttttttaggg aaaatttggc cttcccagaa ggggaggccg gggaacttcc ttcagaacag 60
accagagcca acagccccac cagctccaac agccccacca gcagagagct tcagggttcga 120
ggagacaacc cctgccccga ggcaggagca gaaagacaag gaacccttaa ctgccctcaa 180
atcactcttt ggcagcgacc cttgtctca ataaaagtag ggggtcagat aaaggaggct 240
ctcttgata caggagcaga tgatacagta ttagaagaaa taaatttgcc aggaaaatgg 300
aaacaaaaaa tgataggagg aattggagg tttatcaaag taagacagta tgatcaaata 360
cttatagaaa tttgtgga aaaggctata ggtacagtat tagtaggacc tacacctgtc 420
aacataattg ggagaaatat gttgacctcag cttggctgca cactaaattt tccaattagt 480
cctattgaaa ctgtaccagt aaaattaaag ccaggaatgg atggcccaag ggtcaaacaa 540
tggccattga cagaagaaaa aataaaagca ttaacagcaa tttgtgaaga aatggaaaag 600
gaaggaaaaa ttacaaaaat tggccctgag aatccatata acactccagt atttgccata 660
aaaaagaagg acagtactaa gtggagaaaa ttagtagatt tcagggaact caataaaaga 720
```

```

actcaggact tttgggaagt tcaattagga ataccacacc cagcgggggtt aaaaaagaaa 780
aagtcagtga cagtactgga tgtgggggat gcgtattttt cagttccttt agatgaaggc 840
ttcaggaaat atactgcatt caccatacct agtataaaca atgaaacacc tgggattaga 900
tatcaatata atgtgcttcc acagggatgg aaaggatcac catcaatatt ccagagtagc 960
atgataaaaa tcttagagcc ctttaggaca caaaacccag aaatagttat ctatcaatat 1020
atggatgact tgtatgtagg atctgattta gaaatagggc aacacagagc aaaaatagag 1080
gagttaagag aacacctatt gagatgggga tttactacac cagacaagaa gcatcagaaa 1140
gagcccccat ttctttggat ggggtatgaa ctccatcctg acaaattggac agtacagcct 1200
ataaagctgc cagaaaagga gagctggact gtcaatgata tacagaagtt agtgggaaaa 1260
ttaaactggc aagtcagatt tacgcaggga ttaaagtaag gcaactgtgt aaactcctta 1320
ggggagccaa agcactaaca gacatagtag cattgactga agaggcagaa ttagaattgg 1380
cagagagcag ggaaattcta aaagaaccag tacatggagt atattatgac ccatcaaaag 1440
acttaatagc tgaaatacag aaacaagggc atgaccaatg gacatatcaa gtttaccaag 1500
aaccattcaa aaatctgaaa acaggaaagt atgcaaaaat gaggactgcc cacactaatg 1560
atgtaaaaca gttaacagag gcggtgcaaa aaatagccat ggaaagcata gtaatatggg 1620
gaaagattcc taaatttagg ctaccattc aaaaagaaac atgggagaca tgggtggacag 1680
actattggca agccacctgg attcctgagt gggagtttgt taatactccc cccctagtaa 1740
aattatggta ccagctggag aaagaaccga tagcaggagc agaaacttac tatgtagatg 1800
gagcagccaa tagggaaact aaaataggaa aagcagggtg tggtactgac agaggaaggc 1860
aaaaaattgt tactctaact gaaacaacaa atcaaaagac tgaattacaa gcaattcagt 1920
tagctttgca ggattcagga tcagaagtaa acatagtaac agactcacag tatgcattag 1980
gaatcatcca agcacaacca gataagagtg aatcagaatt agtcaatcaa ataatagaac 2040
agttgataaa aaaggaaagg gtttacctgt catgggtacc agcacacaaa ggaattggag 2100
gaaatgaaca agtagataaa ttggtaagta gtggaatcag gaaagtgtctg tttctagatg 2160
gaatagataa ggctcaagaa gagcatgaaa aatatcacag caattggaga gcaatggcta 2220
gtgagtttaa tctgccaccc atagtagcaa aagaaatagt agccagctgt gataaatgtc 2280
agctaaaagg ggaagccata catggacaag tagactgtag tccaggaata tggcaattag 2340
attgtacca tttagaagga aaagtcattt tggtagcagt ccatgtagcc agtggttaca 2400
tagaagcaga ggtcacccca gcggaaacag gacaagaaac agcacttttc atactaaaat 2460
tagcaggaag atggccagtc aaagtagtac atacagacaa tggcagtaat ttcaccagtg 2520
ctgcagtcaa ggcagcctgt tggtgggcag gtatccacca ggaatttggg attccctaca 2580
atccccaaag tcaaggagta gtagaatcca tgaataaaga attaaagaaa attatagggc 2640
aggtaagaga tcaagctgag caccttaaga cagcagtaca aatggcagta ttcattcaca 2700
attttaaaag aaaagggggg attggggggg acagtgcagg ggaaagaata atagacataa 2760
tagcaacaga catacaaact agagaattac aaaaacaaat tataaaaatt caaaattttc 2820
gggtttatta cagagacagc agagacccta tttggaaagg accagccaaa ctactctgga 2880
aagggtgaagg ggcagtagta atacaagata atagtgcacat aaaggtaata ccaaggagga 2940
aagcaaaaat cattagggac tatggaaaac agatggcagg tactgatagt gtggcaggta 3000
gacaggatga agattag                                     3017

```

<210> 84

<211> 579

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM751.3; gene=vif

<400> 84  
atggaaaaca gatggcaggt actgatagtg tggcaggtag acaggatgaa gattagaaca 60  
tggaatagtt tagtaaagca ccatatgtat gtttcaaaaa gaactggtag atggttttac 120  
agacatcatt atgaaagcag acatccaaaa ataagttcag aagtacacat cccattaggg 180  
gatgccaaat tagtaataaa aacatattgg gggctgcatc caggggaaag agaatggcat 240  
ttgggtcatg gagtctccat agaatggaga ttgagaagat acagcacaca agtagaccct 300  
ggcctggcag accagctaata tcatatgcat tattttaatt gttttgcaga ctctgccata 360  
agaaaagccc tactaggaca tatagttatt cctaggtgtg attatcaagc aggacataat 420  
aaggtaggat ccctacaata cttggcactg acagcattga taaaaccaa aaagataaag 480  
ccacctttac ctagtgttag gaaattagta gaggatagat ggaacaagcc ccagaaaacc 540  
aagggccgca gagggaacca tataatgaat gggcactag 579

<210> 85

<211> 291

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM751.3; gene=vpr

<400> 85

atggaacaag cccagaaaa ccaagggccg cagaggggaac catataatga atgggcacta 60  
gagcttttag aggagctcaa gcaggaagct gtcagacact ttcctagaac atggctccat 120  
aacttaggac aacatatcta ccaaacctac ggggatactt ggacgggggt tgaagctcta 180  
ataagaatac tgcaacaact actgtttatt catttcagaa ttggatgcca acatagcaga 240  
ataggcatta tgcgacagag aagagcaaga aatggagcca gtagatccta g 291

<210> 86

<211> 2646

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96AM751.3; gene=tat

<400> 86

atggagccag tagatcctag actagagccc tggaaatcatc caggaagtca acctaaaact 60  
ccttgtaata agtggtattg taaacactgt agctatcatt gtctagtttg ctttcagaca 120  
aaaggcttag gcatttccta tggcaggaag aagcggagac aacgacgaag cgctcctcca 180  
agcagtgagg atcatcaaaa tcctatatca aagcagtaag taaaaagtaa tagatgtaat 240  
gttaaattta gaagcaagag tagattatag aataggagta ggagcattaa tagcagcact 300  
aatcatagca atagctgtgt ggatcatagt atatatagaa tatagaaaat tgtcaagaca 360  
aagaaaaata gaccggttaa ttaaaagaat tagagaaagg gcagaagaca gtggcaatga 420  
gagtgaaggg gataatgagg aattggcaac aatggtggat atggggcatc ttaggctttt 480  
ggatgctatt gatgtgtaat gcaatgggga aattgtgggt cacagtctac tatggggtac 540  
ctgtgtggaa agaagcaaaa actactttat tttgtgcatc agatgctaaa gcatatgaga 600  
cagaagtgca taatgtttgg gctacacatg cctgtgtacc cacagacccc aaccacaag 660  
aaatggtttt ggaaaatgta acagaaaagt ttaacatgtg ggaaaataac atggtggatc 720

```

agatgcatga ggatataatc agtttatggg accaaagcct aaagccatgt gttaaagttga 780
ccccactctg tgtcacttta aactgtactg ctaatataac caacaatgct aatataacca 840
acaatgctaa tataaccaac tataataatg aaactgacat gagaaattgc tctttcaata 900
taaccacaga attaagagat aagaggaggc aagtagatgc actcttttat aaacttgata 960
tagtaccaat taatgagaat tccagtgaat atagattaat aaattgtaat acctcggcca 1020
taacacaagc atgtccaaag gttacttttg acccaatccc tatacattat tgtgctccag 1080
ctggttatgc gattctaaag tgtaacaata agacattcaa tggacagga ccatgcaata 1140
atgtcagcac agtacaatgt acacatggaa ttaagccagt agtatcaact caattactgt 1200
taaattggtag tctagcagaa gaagagataa taattagatc taaaaatatg acagacaatg 1260
ccaaaataat aatagtagat cttaatgaat ctgtagaaat tgtgtgtaca agacccaaca 1320
ataatacaag gaaaagtgtg aggataggac caggacaaac attctatgca acaggagaaa 1380
taataggaaa tataagacaa gcatattgta acatcagtga aggcaaatgg aataacactc 1440
tacaaagggg aggtgaaaaa ttaagaaaat acttccttaa taaaacaata agctttgcac 1500
catcctcagg aggggaccta gaaattacaa cacatagctt taattgtaga ggagaatttt 1560
tctattgcaa tacatcaaaa ctgtttaatg gtacgtttaa tggtagaaaac acttctaata 1620
atagaagtaa ttcgaccatt acgcttcaat gcagaataaa acaaattaca aacatgtggc 1680
agggggtagg acaagcaatg tatgctctc caattaaagg aaacataaca tgtaaataca 1740
atatcacagg actactatta acacgtgatg gagggacaaa tgacacagag acaccagaga 1800
cattcagacc tggaggagga gacatgaagg acaattggag aagtgaatta tataaatata 1860
aagtggtaga aattaagcca ttaggagtag caccactaa ggcacgaagg agagtggtag 1920
agagagaaaa aagagcagta ggaataggag ctgtgttcct tgggttcttg ggagcagcag 1980
gaagcactat gggcgagca tcaataacgc tgacggtaca ggtcagacaa ttattgtctg 2040
gtatagtgc acagcaaagc aatttgctga gggctataga ggcgcaacag cacatgttgc 2100
aactcacagt ctggggcatt aagcagctcc aggcaagagt cttggctata gaaagatacc 2160
taaaggatca acagctccta gggatttggg gctgctctgg aaaactcatc tgcaccactg 2220
ctgtgccttg gaactctagt tggagcaaca aatctgaacg ggagatttgg gataacatga 2280
cctggatgca gtgggataga gaaattaata attacacaga aacaatatat aggttgcttg 2340
aagtctcgca aaaccagcag gaaaataatg aaagggattt actagcattg gacagttgaa 2400
aaaatctgtg gaattggttt aatataacaa attggctgtg gtatataaaa atattcataa 2460
tgataatagg aggttgata ggtttaagaa taatttttgc tgtgctctct atagtaaata 2520
gagttaggca ggggtactca cctttgtcgt tgcagaccct tatcccaacc ccgagggaa 2580
cagacaggct cggaagaatc gaagaagaag gtggagagca agacagagac agatcaattc 2640
gattag 2646

```

<210> 87

<211> 2631

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96ZM751.3; gene=rev

<400> 87

```

atggcaggaa gaagcggaga caacgacgaa gcgctcctcc aagcagtgag gatcatcaaa 60
atcctatatc aaagcagtaa gtacaaagta atagatgtaa tgttaaattt agaagcaaga 120
gtagattata gaataggagt aggagcatta atagcagcac taatcatagc aatagctgtg 180
tggtatcatag tatatataga atatagaaaa ttgtcaagac aaagaaaaat agaccggtta 240
attaaaagaa ttagagaaaag ggcagaagac agtggcaatg agagtgaagg ggataatgag 300

```

```

gaattggcaa caatggtgga tatggggcat cttaggcttt tggatgctat tgatgtgtaa 360
tgcaatgggg aaattgtggg tcacagtcta ctatggggta cctgtgtgga aagaagcaaa 420
aactacttta ttttgtgcat cagatgctaa agcatatgag acagaagtgc ataatgtttg 480
ggctacacat gcctgtgtac ccacagaccc caaccacaa gaaatggttt tggaaaatgt 540
aacagaaaag ttaacatgt gggaaaataa catggtggat cagatgcatg aggatataat 600
cagtttatgg gaccaaagcc taaagccatg tgtaaagttg acccactct gtgtcacttt 660
aaactgtact gctaataata ccaacaatgc taatataacc aacaatgcta atataaccaa 720
ctataataat gaaactgaca tgagaaattg ctctttcaat ataaccacag aattaagaga 780
taagaggagg caagtagatg cactctttta taaacttgat atagtaccaa ttaatgagaa 840
ttccagtga ttagattaa taaattgtaa tacctcggcc ataacacaag catgtccaaa 900
ggttactttt gacccaatcc ctatacatta ttgtgctcca gctggttatg cgattctaaa 960
gtgtaacaat aagacattca atggaacagg accatgcaat aatgtcagca cagtacaatg 1020
tacacatgga attaagccag tagtatcaac tcaattactg ttaaatggta gtctagcaga 1080
agaagagata ataattagat ctaaaaatat gacagacaat gccaaaataa taatagtaca 1140
tcttaatgaa tctgtagaaa ttgtgtgtac aagacccaac aataatacaa ggaaaagtgt 1200
gaggatagga ccaggacaaa cattctatgc aacaggagaa ataataggaa atataagaca 1260
agcatattgt aacatcagtg aaggcaaatg gaataacact ctacaaaggg taggtgaaaa 1320
attaagaaaa tacttccta ataaaacaat aagctttgca ccctcctcag gaggggacct 1380
agaaattaca acacatagct ttaattgtag aggagaattt ttctattgca atacatcaaa 1440
actgtttaat ggtacgttta atggtacaaa cacttcta at gatagaagta attcgacct 1500
tacgcttcaa tgcagaataa aacaaattac aaacatgtgg cagggggtag gacaagcaat 1560
gtatgctcct ccaattaaag gaaacataac atgtaaatca aatatcacag gactactatt 1620
aacacgtgat ggagggacaa atgacacaga gacaccagag acattcagac ctggaggagg 1680
agacatgaag gacaattgga gaagtgaatt atataaatat aaagtggtag aaattaagcc 1740
attaggagta gcacccacta aggcacgaag gagagtgggt gagagagaaa aaagagcagt 1800
aggaatagga gctgtgttcc ttgggttctt gggagcagca ggaagcacta tgggcgcagc 1860
atcaataacg ctgacggtac aggtcagaca attattgtct ggtatagtgc aacagcaaa 1920
caatttgctg agggctatag aggcgcaaca gcacatgttg caactcacag tctggggcat 1980
taagcagctc caggcaagag tcttggtat agaaagatac cttaaaggatc aacagctcct 2040
agggatttg ggctgctctg gaaaactcat ctgcaccact gctgtgcctt ggaactctag 2100
ttggagcaac aaatctgaac gggagatttg ggataacatg acctggatgc agtgggatag 2160
agaaattaat aattacacag aaacaatata taggttgctt gaagtctcgc aaaaccagca 2220
ggaaaataat gaaagggtt tactagcatt ggacagtga aaaaatctgt ggaattggtt 2280
taatataaca aattggctgt ggtatataaa aatattcata atgataatag gaggcttgat 2340
aggtttaaga ataattttt ctgtgctctc tatagtaaat agagttaggc aggggtactc 2400
acctttgtcg ttgcagaccc ttatcccaac cccgagggaa ccagacaggc tcggaagaat 2460
cgaagaagaa ggtggagagc aagacagaga cagatcaatt cgattagtga acggattctt 2520
agcacttgtc tgggacgacc tccggagcct gtgccttttc agctaccacc gcttgagaga 2580
cttcatattg attgcagcga ggggactaca gaggggtgg gaaactctta a 2631

```

<210> 88

<211> 261

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96AM751.3; gene=vpu

<400> 88

```
atgttaaatt tagaagcaag agtagattat agaataggag taggagcatt aatagcagca 60
ctaatcatag caatagctgt gtggatcata gtatatatag aatatagaaa attgtcaaga 120
caaagaaaaa tagaccggtt aattaaaaga attagagaaa gggcagaaga cagtggcaat 180
gagagtgaag gggataatga ggaattggca acaatggtgg atatggggca tcttaggctt 240
ttggatgcta ttgatgtgta a 261
```

<210> 89

<211> 2544

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96AM751.3; gene=env

<400> 89

```
atgagagtga aggggataat gaggaattgg caacaatggt ggatatgggg catcttaggc 60
ttttggatgc tattgatgtg taatgcaatg gggaaattgt gggtcacagt ctactatggg 120
gtacctgtgt ggaaagaagc aaaaactact ttatittgtg catcagatgc taaagcatat 180
gagacagaag tgcataatgt ttgggctaca catgcctgtg taccacaga cccaaccca 240
caagaaatgg ttttggaaaa tgtaacagaa aagttaaaca tgtgggaaaa taacatgggtg 300
gatcagatgc atgaggatat aatcagttta tgggaccaa gcctaaagcc atgtgtaaag 360
ttgacccac tctgtgtcac tttaaactgt actgctaata taaccaacaa tgctaataata 420
accaacaatg ctaatatata caactataat aatgaaactg acatgagaaa ttgctctttc 480
aatataacca cagaattaag agataagagg aggcaagtag atgcactctt ttataaactt 540
gatatagtag caattaatga gaattccagt gaatatagat taataaattg taatacctcg 600
gccataacac aagcatgtcc aaaggttact tttgaccaa tccctataca ttattgtgct 660
ccagctgggt atgcgattct aaagtgtaac aataagacat tcaatggaac aggaccatgc 720
aataatgtca gcacagtaca atgtacacat ggaattaagc cagtagtatc aactcaatta 780
ctgttaaagt gtagtctagc agaagaagag ataataatta gatctaaaaa tatgacagac 840
aatgccaaaa taataatagt acatcttaat gaatctgtag aaattgtgtg tacaagaccc 900
aacaataata caaggaaaag tgtgaggata ggaccaggac aaacattcta tgcaacagga 960
gaaataatag gaaatataag acaagcatat tgtaacatca gtgaaggcaa atggaataac 1020
actctacaaa gggtaggtga aaaattaaga aaatacttcc ctaataaaac aataagcttt 1080
gcaccatcct caggagggga cctagaaaatt acaacacata gctttaattg tagaggagaa 1140
tttttctatt gcaatacatc aaaactgttt aatggtacgt ttaatggtag aaacacttct 1200
aatgatagaa gtaattcgac cattacgctt caatgcagaa taaaacaaat tacaacatg 1260
tggcaggggg taggacaagc aatgtatgct cctccaatta aaggaaacat aacatgtaaa 1320
tcaaataatc caggactact attaacacgt gatggaggga caaatgacac agagacacca 1380
gagacattca gacctggagg aggagacatg aaggacaatt ggagaagtga attatataaa 1440
tataaagtgg tagaaattaa gccattagga gtagcaccca ctaaggcacg aaggagagtg 1500
gtggagagag aaaaaagagc agtaggaata ggagctgtgt tccttgggtt cttgggagca 1560
gcaggaagca ctatgggctg agcatcaata acgctgacgg tacagggtcag acaattattg 1620
tctggtatag tgcaacagca aagcaatttg ctgagggtta tagaggcgca acagcacatg 1680
ttgcaactca cagtctgggg cattaagcag ctccaggcaa gagtcttggc tatagaaaga 1740
tacctaaagg atcaacagct ctaggggatt tggggctgct ctggaaaact catctgcacc 1800
actgctgtgc cttggaactc tagttggagc aacaaatctg aacgggagat ttgggataac 1860
atgacctgga tgcagtggga tagagaaatt aataattaca cagaaacaat atatagggtg 1920
```

```

cttgaagtct cgcaaaacca gcaggaaaat aatgaaaggg atttactagc attggacagt 1980
tgaaaaaatc tgtggaattg gtttaatat acaaattggc tgtggtatat aaaaatattc 2040
ataatgataa taggaggctt gataggttta agaataattt ttgctgtgct ctctatagta 2100
aatagagtta ggcaggggta ctacaccttg tcgttgca gaaggtggag agcaagacag agacagatca 2220
gaaccagaca ggctcggaag aatcgaagaa gaaggtggag agcaagacag agacagatca 2220
attcgattag tgaacggatt cttagcactt gtctgggacg acctccggag cctgtgcctt 2280
ttcagctacc accgcttgag agacttcata ttgattgcag cgaggggact acagaggggg 2340
tgggaaactc ttaagtatct ggggagtcct gtacagtatt ggggtctaga gctaaaaaag 2400
agtgcattta gtttgcttga tactatagca atagcagtag ctgaaggaac agatagaatt 2460
atagaattaa cacaaagaat ttgtagagct atccgcaacg tacctagaag aataagacag 2520
ggctttgaag cagctttgca ataa 2544

```

<210> 90

<211> 624

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=96AM751.3; gene=nef

<400> 90

```

atgggaggca agtgggtcaaa acgcagtata gttggatggc cttaaagtaag agaaagaata 60
gcaagaactg atccagcagc agagggagta ggagcagcgt ctcaagactt agataaatat 120
ggggcactta caagcagtaa cacaagtacc aataatgctg attgtgcctg gctggaagcg 180
caagaggagg agggagaagt aggcctttcca gtcagacctc aggtaccttt aagaccaatg 240
acttataagt cagcatttga tctcagcttc tttttaaag aaaagggggg actggatggg 300
ttaatttact gtaagaaaag acaagaaatc ctcgatttgt gggcttatca cacacaaggc 360
tacttccttg attggcaaaa ctatacaccg ggaccaggga tcagatatcc actgaccttt 420
ggatggtgct acaagctagt gccagttgac ccaagggaag tagaagaagc caacgaagga 480
gaggacaact gtttgctaca ccctataagc cagcatggaa tagaagatga agacagagaa 540
gtattaaggt ggaagtttga cagttcccta gcacgcagac acatggccccg cgagctacat 600
ccggagtatt acaaagactg ctga 624

```

<210> 91

<211> 1491

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CY017.41; gene=gag

<400> 91

```

atgggtgcca gagcgtcaat attaagcggg ggaaaattag atgcttgga gaaaattcgg 60
ttaaggccag ggggaaagaa aaaatataga ctgaaacatt tggtatgggc aagcaggagg 120
ctggagaaat tctcaattaa ccctggcctt ttagaaacac cagagggatg tagacaaata 180
ataaggcagt tacaaccagc tctccaaaca ggaacagaag aacttaaattc attatataat 240
acagtagtag tcctctactg ggtacatcaa agggtagatg taaaagacac caaggaagct 300
ctagataaaa tagaggaaga acaaaacaag cagaaaacac agcatgcagc agctgacaca 360

```



```

gggaacagca gcagtcaaaa ttatcccata gtgcaaaatg cacaagggca aatggtacac 420
caggctatat cacctaggac gttgaatgcc tgggtcaaag tagtagaaga aaaggctttc 480
agcccagaag taatacctat gtttacagca ttatcagaag gagccacccc acaagactta 540
aatactatgc taaacacagt ggggggacat caagcagcta tgcaaagtgt aaaagatacc 600
atcaatgagg aagctgcaga atgggacagg gtacatccag tacatgcagg gcctattcca 660
ccaggccaga tgagagaacc aaggggaagt gacatagcag gaactactag tacccttcag 720
gaacaaatag gttggatgac cagcgatcca cccatcccag tgggagaaat ttataaaaga 780
tggataatcc tgggattaaa taaaatagta agaattgtata gccctgtcag cattttggac 840
ataagacaag ggccaaaaga accctttaga gattatgtgg ataggttctt taaaactcta 900
agagctgagc aagccacaca ggaggtaaaa aactggatga cggacacctt gctggtccaa 960
aatgcgaacc cagattgtag atccatcttg agagcattag gaccaggggc ctcattagaa 1020
gaaatgatga cagcatgtca gggagtggga ggaccagcc ataaagcaag ggttttggct 1080
gaagcaatga gccatgtaca aagtacaaat acaaacataa tgatgcagag aggcaatfff 1140
aggggtcaaa aaagaattaa gtgtttcaac tgtggcaagg aaggacacct agccagaaat 1200
tgcagggccc ctaggaaaaa gggctgctgg aaatgtggaa aggaaggaca tcaaatgaaa 1260
gattgcactg agagacaggc taatffffff gggaaaattt ggccttccaa caaaggagg 1320
ccaggaaatt ttcctcagag cagaacagag ccaacagccc caccagcaga gaacttgaga 1380
atgggggaag agataacctc ctccctgaag caggaactgg agaccaggga accatacaat 1440
cctgcaattt ccctcaaate actctttggc aacgaccctt tgttacagta a 1491

```

<210> 92

<211> 3012

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CY017.41; gene=pol

<400> 92

```

tttttttaggg aaaatttggc cttccaacaa agggaggcca ggaaattttc ctcagagcag 60
aacagagcca acagccccac cagcagagaa cttgagaatg ggggaagaga taacctcctc 120
cctgaagcag gaactggaga ccagggaacc atacaatcct gcaattttcc tcaaatcact 180
ctttggcaac gaccccttgt tacagtaaag atagagggac agctaaaaga agctctatta 240
gatacaggag cagatgatac agtgttagaa gaaataaatt tgccaggaaa atggaaacca 300
aaaatgatag ggggaattgg aggttttatc aaagtaagac aatatgatca gatagctata 360
gaaatttgtg gaaaaagggc cataggtaca gtattagtag gacctacccc tgtcaacata 420
atcggaagaa atatgttggg tcagcttggg tgtactttaa attttccaat tagtcctatt 480
gaaactgtac cagtaaaatt aaagccagga atggatgggc caaagggtta acaatggcca 540
ttgacagaag aaaaaataaa agcatthaaca gaaatctgta aagaaatgga aaaggaagga 600
aaaatttcaa aaattgggccc tgaaaatcca tacaacactc cagtgtttgc tataaagaaa 660
aaagacagca ctaaatggag aaaattagta gatttttagag aactcaataa gagaactcaa 720
gacttctggg aagttcagtt aggaatacca catccagcag gattaaaaaa gaaaaagca 780
gtaacagtac ttgatgtggg ggacgcataat ttttcggtc cttacatga agacttcaga 840
aaatatactg cattcaccat acctagtacc aacaatgaga caccaggagt taggtatcag 900
tacaatgtac ttccacaggg atggaaagga tcaccagcaa tattccagag tagcatgaca 960
aagatcttag agccctttag atcaaagaat acagaattaa tcatctacca atacatggat 1020
gacttgtag taggatctga tttagaaata agccagcata gagtaaaaat agaggaatta 1080
agggctcact tattgaaatg gggattttat acaccagaca aaaaacatca gaaagaacct 1140

```

```

ccatttcttt ggatgggata tgagcttcat cctgacaaat ggacagtcca gcctataaaag 1200
ctgccagaaa aagacagctg gactgtcaat gatatacaga aattagtagg gaaattaaat 1260
tgggcaagtc agatttatgc agggattaaa gtaaagcaac tgtgtaaaact ccttagagga 1320
gccaaagcac taacagacat agtaacactg actaaagaag cagagttaga attagaagag 1380
aacagggaaa ttttaaaaac ccctgtacat ggggtatact atgacccatc aaaagactta 1440
atagcagaaa tacagaaaca agggcaagac caatggacat atcaaattta tcaggaaacc 1500
tttaagaatc tgaaaacagg gaaatatgca aaaaggaggt ccaccacac taatgatata 1560
aaacagttaa cagaagcagt acaaaaaata accatggaaa gcatagtgat atggggaaaag 1620
actcctaaat ttaaattacc catacaaaag gaaacatggg agacatgggt ggcgaggat 1680
tggcaggcta cctggattcc tgagtgggag tttgtcaata cccctcctct agtaaaactg 1740
tggtaccagt tagaaaaaga acccatagca ggagcagaaa ctttctatgt agatggggca 1800
gctaatagag agactaaact aggaaaggca gggtatgtca ctgacagagg aagacaaaaa 1860
attgtctccc tgacggagac aacaaatcaa aagactgaat tacatgcaat ctatttggct 1920
ttacaggatt caggattaga agtgaacata gtgacagatt cacagtatgc attaggaatc 1980
attcaagcac aaccagaaag gagtgaatca gagatagtca atcaaataat agaaaaatta 2040
atagaaaagg aaagggtcta cctatcatgg gtaccagcac acaaagggat tggaggaaat 2100
gaacaagtag acaaattagt cagttctgga atcaggaaag tgctattttt agatgggata 2160
gataaggctc aagaggaaca tgaaagatat cacagcaatt ggagagcaat ggctcatgac 2220
tttaatctac cacctgtagt agcaaaagaa atagtagcta gctgtgataa atgtcagcta 2280
aaaggggaag ccatgcatgg acaagtagac tgtagtccag gaatatggca actagattgc 2340
acacatcttg aaggaaaagt tatcctggtg gcagtccatg tggccagtgg ctatatagaa 2400
gcagaagtca tccaacaga aacaggacag gatacagcat actttatatt aaaactagca 2460
ggaagatggc cagtaaaagt aatacataca gacaatgggc ccaatttcat cagtgaaca 2520
gttaaggcag cctgttggtg ggcaggatc caacaagaat ttgggattcc ctacaatccc 2580
caaagtcaag gagtagtgga atctatgaat aaagaattaa agaaaatcat agggcaggta 2640
agagatcaag ctgaacacct taagacagca gtacaaatgg cagtattcat tcacaatttt 2700
aaaagaaaag gggggattgg gggatacagt gcaggggaaa gaataataga cataatagca 2760
acagatatac aaactaaaga actacaaaga caaattacaa aaattcaaaa ttttcgggtt 2820
tattacaggg acagcagaga tccaatttgg aaaggaccag caaaactcct ttggaaaggt 2880
gaaggggcag tagtaataca agacaatagt gacataaagg tagtaccaag aagaaaagca 2940
aagatcatta gggattatgg aaaacagatg gcagggtgat attgtgtggc aggtagacag 3000
gatgaggatt ag 3012

```

```

<210> 93
<211> 579
<212> DNA
<213> Human immunodeficiency virus type 1

```

```

<220>
<223> isolate=94CY017.41; gene=vif

```

```

<400> 93
atggaaaaca gatggcagggt gatgattgtg tggcaggtag acaggatgag gattagaaca 60
tggaacagtt tagttaaaca tcatatgtat atttcaagga aagctaaagg ttgggtctat 120
aacatcact atgaaagcag aaatccaaga ataagttcag aagtacacat cccgctaggg 180
gaggctagaa taatagtaag aacatattgg ggtctgcaca taggagaaaa agactggcac 240
ttgggtcatg gagtctccat agaatggagg caaaacagggt atcatacaca aatagaccct 300
gatctggcag accatctaata ccatctgtat tatttttgact gtttttcaga atctgccata 360

```

aggaaagcca taataggaga aatagttagt cctaggtgtg aatatcaagc aggacataac 420  
aaggtagggt ctctgcaata tttggcattg aaagcagtag tagcttcaac aaggacaaaag 480  
ccacctttgc ctagtgttag gaaattagta gaggatagat ggaacaagcc ccagaagacc 540  
aagggccaca gagggagcca tacaatgaat ggatgttag 579

<210> 94

<211> 291

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CY017.41; gene=vpr

<400> 94

atggaacaag cccagaaga ccaagggcca cagagggagc catacaatga atggatgtta 60  
gaactgttag aggagctcaa gcaggaagct gttagacatt tccctaggca ctggctacat 120  
ggcctaggac aatacatcta taatacctat ggggatacct ggaaggagt tgaagttatc 180  
ataagatatc tgcaacaact actgtttgtc catttcagaa ttgggtgcca acatagcagg 240  
ataggcatta ttcgaagaag aagagtaagg gatggagcca gtagacccta a 291

<210> 95

<211> 2655

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CY017.41; gene=tat

<400> 95

atggagccag tagaccctaa actagagccc tggaaccatc cgggaagtca gcctaaaact 60  
gcttgtagca aatgtttattg taaacgctgt tgctatcatt gccagttgtg ctttataaac 120  
aaaggcttag gcatctccta cggcaggaag aagcgacgac cccgacgaaa gccttctcca 180  
agcaataagg accatcaaaa tcctatacca aagcagtaag tagtagtaat taatatatgt 240  
aatgttacct ttagtaatat tggcaatagt aggactgata gtagctttaa tcttagcaat 300  
agttgtatgg actatagtat tcatagaata taagaaaatt aagaagcaaa ggaaaataga 360  
ctgggttaatc aaaagaataa gtgagagagc agaagacagt ggcaatgaga gtgatgggga 420  
cacagaggaa ctatcagcac ttgtggagag ggggcatctt gattttgggg atgttaataa 480  
tgtgtaaagc tacagatttg tgggtcacag tatactatgg agtacctgtg tggaaagatg 540  
cagataccat cctattttgt gcatcagatg ctaaagcata tgatacagaa gtgcataatg 600  
tatgggccac acatgcctgt gtaccacacag accccaaccc acaagaaata aacctggaaa 660  
atgtaacaga aaattttaat atgtggaaaa ataacatggg agagcagatg caagaagata 720  
taatcagctt atgggatcaa agcctaaaagc catgtgtaaa attaaccctg ctctgcgtca 780  
ttttaaattg tagcaatgcc aataccagca cccatagcaa tagcagtagc acccagagcc 840  
ccattaatga agaaataaaa aactgctctt acaatactac cacaatacta agagataaga 900  
cacaaaaagt ttattcactg ttttatagac ttgatgtagt acaacttgat gaaagtgaaa 960  
ataagaatac atcaggtagt aatactctgt atagactaat aaattgtaat acctcaacca 1020  
tcacacaagc gtgtccaaaag gtaacctttg agccaattcc tatacattat tgtgccccag 1080  
ctggttttgc gattctaaaag tgtaaggatc cgagattcaa tggaacaggg tcatgcaaga 1140

```

atgttagctc agtacaatgt acacatggaa ttaaaccagt agcatcaact caactgctgt 1200
tgaatggcag tctagcagaa ggagggaataa taatgattag atctgaaaat attacaaaca 1260
atgccaaaaa cataatagtt cagtttacta agcctgtact aattacttgt atcagaccca 1320
acaacaatac aagaaaaagt atacgctttg gaccaggaca agccttctat acaaatgaaa 1380
taatagggga cataagacaa gcacattgta atatcaacaa aacattatgg aatgacactt 1440
tacaaaaggt agctgaacaa ttaagagaga aattccctaa gaaaaccata atctttacta 1500
actcctcagg aggggaccca gaaattacaa cacttagttt taattgtgca ggagaatttt 1560
tctattgcaa tacaacaggc ctgtttaatg gtacgtggtg gaacaatggg acgtggaacg 1620
ggccctacac acctaataac accaatggaa gtataatcct cccatgcaga ataaaaacaa 1680
ttataaacat gtggcagaga gtaggaagag caatgtatgc cctcccatt gcaggaataa 1740
taaagtgtac atcaaacatt acaggaataa tattgacaag agatggtggt aacaatggga 1800
ctaattgagac cttcagacct ggaggaggag atatgaggga caattggaga agtgaattat 1860
ataaatataa agtagtaaaa cttgaaccac taggagtagc acctaccagg gcaaaaagaa 1920
gagtgggtgga gagagaaaaa agagcagttg gactgggagc tgtcttcctt ggggttcttg 1980
gagcagcagg aagcactatg ggcgcggcgt cactaacgct gacggtacag gccagacaat 2040
tattgtcttg tatagtgc aaagcaagca atttgctgca ggctatagaa gctcaacagc 2100
atctgttgaa actcacagtc tggggcatta aacagctcca ggcgagggtc ctggctgtgg 2160
aaagatacct aaaggatcaa cagctcctgg gaatttgggg ctgctctgga aaactcatct 2220
gcgccactac tgtgccctgg aacactagtt ggagtaataa gtctcaggat gagatttggg 2280
acaacatgac ctggttgcaa tgggataaag aaattagcaa ttacacaaac ataatatata 2340
ggttacttga agaatcgcaa aaccagcagg aaaagaatga gcaagactta ttggcattag 2400
acaaatgggc agatttgtgg agttggttca acatttcaca ctggctgtgg tatataagaa 2460
tatttataat gatagtagga ggcttgatag gattaagaat agtttttgct ataattactg 2520
tagtaaatag agttaggcag ggatactcac ctgtgtcatt tcagatccct accccaagcc 2580
cagaggggtc cgacaggccc agaggaaccg aagaaggagg tggagagcaa ggcagagaca 2640
gatcgattcg attag                                     2655

```

<210> 96

<211> 2721

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CY017.41; gene=rev

<400> 96

```

acggcaggaa gaagcgacga ccccgacgaa agccttctcc aagcaataag gaccatcaaa 60
atcctatacc aaagcagtaa gtagtagtaa ttaatatatg taatgttacc ttagtaata 120
ttggcaatag taggactgat agtagcttta atcttagcaa tagttgtatg gactatagta 180
ttcatagaat ataagaaaat taagaagcaa aggaaaatag actggttaat caaaagaata 240
agtgaagagag cagaagacag tggcaatgag agtgatgggg acacagagga actatcagca 300
cttgtggaga gggggcatct tgattttggg gatgttaata atgtgtaaag ctacagattt 360
gtgggtcaca gtatactatg gagtacctgt gtggaaagat gcagatacca tcctattttg 420
tgcacagat gctaaagcat atgatacaga agtgcataat gtatgggcca cacatgcctg 480
tgtaccaca gacccaacc cacaagaaat aaacctggaa aatgtaacag aaaattttta 540
tatgtggaaa aataacatgg tagagcagat gcaagaagat ataacagct tatgggatca 600
aagcctaaag ccatgtgtaa aattaacccc gctctgcgtc atttttaaatt gtagcaatgc 660
caataccagc acccatagca atagcagtag caccagagc cccattaatg aagaaataaa 720

```

```

aaactgctct tacaatacta ccacaatact aagagataag acacaaaaag tttattcact 780
gttttataga cttgatgtag tacaacttga tgaaagtga aataagaata catcaggtag 840
taatactctg tatagactaa taaattgtaa tacctcaacc atcacacaag cgtgtccaaa 900
ggtaaccttt gagccaattc ctatacatta ttgtgcccc a gctggttttg cgattctaaa 960
gtgtaaggat ccgagattca atggaacagg gtcattgcaag aatgttagct cagtacaatg 1020
tacacatgga attaaaccag tagcatcaac tcaactgctg ttgaatggca gtctagcaga 1080
aggagggaaa ataattgatta gatctgaaaa tattacaaac aatgccaaaa acataatagt 1140
tcagtttact aagcctgtac taattacttg tatcagaccc aacaacaata caagaaaaag 1200
tatacgcttt ggaccaggac aagccttcta tacaatatgaa ataatagggg acataagaca 1260
agcacattgt aatatcaaca aaacattatg gaatgacact ttacaaaagg tagctgaaca 1320
attaagagag aaattcccta agaaaacat aatctttact aactcctcag gaggggaccc 1380
agaaattaca acacttagtt ttaattgtgc aggagaattt ttctattgca atacaacagg 1440
cctgtttaat ggtacgtggg ggaacaatgg tacgtggaac gggccctaca cacctaataa 1500
caccaatgga agtataatcc tcccatgcag aataaaacaa attataaaca tgtggcagag 1560
agtaggaaga gcaatgtatg cccctcccat tgcaggaata ataaagtgt catcaaact 1620
tacaggaata atattgacaa gagatggtgg taacaatggg actaatgaga ccttcagacc 1680
tggaggagga gatattgagg acaattggag aagtgaatta tataaatata aagtagtaaa 1740
acttgaacca ctaggagtag cacctaccag ggcaaaaaga agagtgggtg agagagaaaa 1800
aagagcagtt ggactgggag ctgtcttctt tgggttcttg ggagcagcag gaagcactat 1860
gggcgcggcg tcaactaacg tgacgggtaca ggccagacaa ttattgtctg gtatagtgc 1920
acagcaaagc aatttgctgc aggctataga agctcaacag catctgttga aactcacagt 1980
ctggggcatt aaacagctcc aggcgagggg cctggctgtg gaaagatacc taaaggatca 2040
acagctcctg ggaatttggg gctgctctgg aaaactcatc tgcgccacta ctgtgccctg 2100
gaacactagt tggagtaata agtctcagga tgagatttgg gacaacatga cctgggttgca 2160
atgggataaa gaaattagca attacacaaa cataatatat aggttacttg aagaatcgca 2220
aaaccagcag gaaaagaatg agcaagactt attggcatta gacaaatggg cagatttgtg 2280
gagttggttc aacatttcac actggctgtg gtatataaga atatttataa tgatagtagg 2340
aggcttgata ggattaagaa tagtttttgc tataattact gtagtaaata gagttaggca 2400
gggatactca cctgtgtcat ttcagatccc taccceaagc ccagaggggc ccgacaggcc 2460
cagaggaacc gaagaaggag gtggagagca aggcagagac agatcgattc gattagtga 2520
cgggttcttc gcacttgccg gggacgacct acggagcctg tgctcttca gttaccaccg 2580
cttgagagat tgcattattg ttgcagcgag gactgtggaa cttctgggac actgcagtct 2640
caagggactg agactggggg ggggaaggtc caagaatctg tggaatcttc tgttatactg 2700
gggtcgggaa ctgaagaata g
2721

```

<210> 97

<211> 246

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CY017.41; gene=vpu

<400> 97

```

atgttacctt tagtaatatt ggcaatagta ggactgatag tagctttaat cttagcaata 60
gttgatgga ctatagtatt catagaatat aagaaaatta agaagcaaag gaaaatagac 120
tggttaatca aaagaataag tgagagagca gaagacagtg gcaatgagag tgatgggggac 180
acagaggaac tatcagcact tgtggagagg gggcatcttg attttgggga tgtaataat 240

```

&lt;210&gt; 98

&lt;211&gt; 2598

&lt;212&gt; DNA

&lt;213&gt; Human immunodeficiency virus type 1

&lt;220&gt;

&lt;223&gt; isolate=94CY017.41; gene=env

&lt;400&gt; 98

```

atgagagtga tggggacaca gaggaactat cagcacttgt ggagaggggg catcttgatt 60
ttggggatgt taataatgtg taaagctaca gatttgtggg tcacagtata ctatggagta 120
cctgtgtgga aagatgcaga taccatccta ttttgtgcat cagatgctaa agcatatgat 180
acagaagtgc ataatgtatg ggccacacat gcctgtgtac ccacagaccc caaccacaa 240
gaaataaacc tggaaaatgt aacagaaaat tttaatatgt ggaaaaataa catggtagag 300
cagatgcaag aagatataat cagcttatgg gatcaaagcc taaagccatg tgtaaaatta 360
accccgctct gcgtcathtt aaattgtagc aatgccata ccagcaccca tagcaatagc 420
agtagcacc agagcccat taatgaagaa ataaaaaact gctcttaca tactaccaca 480
atactaagag ataagacaca aaaagtttat tcaactgttt atagacttga tgtagtaca 540
cttgatgaaa gtgaaaataa gaatacatca ggtagtaata ctctgtatag actaataaat 600
tgtaatacct caaccatcac acaagcgtgt ccaaaggtaa ctttgagcc aattcctata 660
cattattgtg cccagctgg ttttgcgatt ctaaagtgt aggatccgag attcaatgga 720
acagggtcat gcaagaatgt tagctcagta caatgtacac atggaattaa accagtagca 780
tcaactcaac tgctgttgaa tggcagtcta gcagaaggag ggaaaaataa gattagatct 840
gaaaatatta caaacaatgc caaaaacata atagttcagt ttactaagcc tgtactaatt 900
acttgatca gaccaacaa caatacaaga aaaagtatac gctttggacc aggacaagcc 960
ttctatacaa atgaaataat aggggacata agacaagcac attgtaatat caacaaaaca 1020
ttatggaatg acactttaca aaaggtagct gaacaattaa gagagaaatt ccctaagaaa 1080
accataatct ttactaactc ctcaggaggg gaccagaaa ttacaacact tagttttaat 1140
tgtgcaggag aatttttcta ttgcaataca acaggcctgt ttaatggtac gtggtggaac 1200
aatggtacgt ggaacgggcc ctacacacct aataacacca atggaagtat aatcctccca 1260
tgcagaataa aacaaattat aaacatgtgg cagagagtag gaagagcaat gtatgccct 1320
cccattgcag gaataataaa gtgtacatca aacattacag gaataatatt gacaagagat 1380
gggtggaaca atgggactaa tgagaccttc agacctggag gaggagatat gagggacaat 1440
tgagagaagt aattatataa atataaagta gtaaaaactg aaccactagg agtagcacct 1500
accagggcaa aaagaagagt ggtggagaga gaaaaaagag cagttggact gggagctgtc 1560
ttccttgggt tcttgggagc agcaggaagc actatgggcg cggcgtcact aacgctgacg 1620
gtacaggcca gacaattatt gtctgtgata gtgcaacagc aaagcaattt gctgcaggct 1680
atagaagctc aacagcatct gttgaaactc acagtctggg gcattaaaca gctccaggcg 1740
agggctcctg ctgtggaaag atacctaaag gatcaacagc tcctgggaat ttggggctgc 1800
tctggaaaac tcatctgcgc cactactgtg ccctggaaca ctagttggag taataagtct 1860
caggatgaga tttgggacaa catgacctgg ttgcaatggg ataaagaaat tagcaattac 1920
acaaacataa tatataggtt acttgaagaa tcgcaaaacc agcaggaaaa gaatgagcaa 1980
gacttattgg cattagacaa atgggcagat ttgtggagtt ggttcaacat ttcacactgg 2040
ctgtggtata taagaatatt tataatgata gtaggaggct tgataggatt aagaatagtt 2100
tttgctataa ttactgtagt aaatagagtt aggcagggat actcacctgt gtcatttcag 2160
atccctaccc caagcccaga gggccccgac aggccagag gaaccgaaga aggaggtgga 2220

```

```

gagcaaggca gagacagatc gattcgatta gtgaacgggt tcttcgcact tgcctgggac 2280
gacctacgga gcctgtgcct cttcagttac caccgcttga gagattgcat attgattgca 2340
gcgaggactg tggaacttct gggacactgc agtctcaagg gactgagact ggggtgggaa 2400
ggtctcaaga atctgtggaa tcttctgtta tactggggtc gggaactgaa gaatagtgt 2460
attagcttat ttgatactat agcagtagca gtagctgagt ggacagatag ggttatagaa 2520
atagggcaaa gagctttcag agctattctc aacataccta gaagaatcag acagggctta 2580
gaaagggctt tactataa 2598

```

<210> 99

<211> 654

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94CY017.41; gene=nef

<400> 99

```

atggggggca agtgggtcaaa aaggagcata ccaggatggc ctgctattag ggagagaatg 60
agaagaactc ctccaacagc acaaagaaca gaagcagtgt ctccagcagc accaggagta 120
ggagcagtgt ctcaagattt agctactcat ggagcagtca caagcagtaa tacagcagct 180
actaatcctg attgcgcttg ggtggaagcg caagaagagg agagtgaagt aggcttccca 240
gtcaggccac aggtaccttt aaggccaatg accttcaagg gagcgtttga tctcagcttc 300
tttttaaaag aaaagggggg actggatggg ttaatttact cccagaaaag acaagacatc 360
cttgatatgt gggcttacca cacacaaggc tacttccctg attggcagaa ttacacacca 420
gggccaggga tcagataccc attaacattt ggatggtgct tcaagctagt accagtagag 480
ccatctgagg tagaagaagc tactcaggga gagaacaaca gcttattaca ccctatatgc 540
caacatggag tagatgacct tgaaagagaa gtgttaagat gggagtttga tagaagcctg 600
gcacggagac acagagcccg agagctgcat ccggagtact acaaagactg ctga 654

```

<210> 100

<211> 1476

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94IN476.104; gene=gag

<400> 100

```

atgggtgcca gagcgtcaat attaagaggg ggaaaattag atagatggga aaaaattcgg 60
ttaaggccag ggggaaagaa acattatatg ataaaacact tagtatgggc aagcagggag 120
ctggaaagat ttgcgcttaa ccttggcctt ttagagacgt cagacggatg taaacaaata 180
ataaaacagc tacatccagc tcttaagaca ggaacagagg aacttaggtc attattcaac 240
acagtagcaa ctctctattg tgtacatgca gggatagagg tacgagacac caaggaagcc 300
ttagacaaga tagaggaaga acaaaacaaa agtcagcaaa aaatacagca ggcaaaagag 360
gctgacggaa aggtcagtca aaattatcct atagtcaaaa atctccaagg gcaaatggta 420
caccagcccc tatcacctag aactttgaat gcgtgggtaa aagtaataga ggagaaggct 480
tttagcccag aggtaatacc catgttcaca gcattatcag aaggagccac cccctctgat 540
ttaaacacca tgttaaatac agtgggggga catcaagcag ccatgcaa atgttaaaagat 600

```

```

accatcaacg aggaggctgc ggaatgggat agattacatc cagtacatgc agggcctaata 660
ccaccaggcc agatgagaga accaagggga agtgatatag caggaactac tagtaccctt 720
caggaacaaa tagcatggat gacaggtaac ccacctattc cagtgggaga catctataaa 780
agatggataa ttctggggtt aaataaaaata gtaagaatgt atagccctgt cagcattttg 840
gacataagac aaggggccaaa ggaacccttt agagactatg tagaccggtt ctttaaaact 900
ttaagagctg aacaagctac acaagaagta aaagggttga tgacagacac cttgttggtc 960
caaaatgcaa acccagattg taagaccatt ttaagagcat taggaccagg ggcttcatta 1020
gaagaaatgg tgacagcatg tcaaggagtg ggaggaccta gccacaaagc aagagtgttg 1080
gctgaggcaa tgagccaatc acatagtaac ataatgatgc agagaggcaa ttttaaaggc 1140
cctaaaagaa ttgttaaagt cttcaactgt ggcaagggaag ggcacatagc cagaaattgc 1200
agggccccta gaaaaagagg ctgttggaag tgtgggcaag aaggacacca aatgaaagac 1260
tgtactgaga ggcaggctaa ttttttaggg aaaatttggc cttcccacaa ggggaggcca 1320
gggaatttcc ttcaaacag gccagagcca acagccccac cagcagagag cttcagggttc 1380
aaggagacaa cccccgtcc gaagcaggag tcgaaagaca gggaaccctt aacttccttc 1440
aatcactct ttggcagcga ccccttgtct caataa 1476

```

<210> 101

<211> 3011

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94IN476.104; gene=pol

<400> 101

```

tttttttaggg aaaatttggc cttcccacaa ggggaggcca gggaatttcc ttcaaacag 60
gccagagcca acagccccac cagcagagag cttcagggttc aaggagacaa cccccgtcc 120
gaagcaggag tcgaaagaca gggaaccctt aacttccttc aaatcactct ttggcagcga 180
ccccttgtct caataaaagt agggggccag ataaaggaag ctctcttaga cacaggagca 240
gatgatacag tattagaaga aatagctttg ccaggaagat ggaaaccaa aatgatagga 300
ggaattggag gttttatcaa agtaagacag tatgatcaaa tacttataga aatttgttga 360
aaaaaggcta taggtacagt attagtagga cctacacctg tcaacataat tggaagagat 420
atgttgactc agcttgatg cactctaaat tttccaatta gccccattga aactgtacca 480
gtaaaattaa agccaggaat ggatggccca aagggttaaac agtggccatt gacagaagag 540
aaaataaaaag cattaacaga aatttgtaaa gaaatggaga aggaaggaaa aattacaaaa 600
attgggcctg aaaatccata taacactcca gtatttgcca taaaaaggaa ggacagtact 660
aagtggagaa aattagtaga tttcaggagg ctcaataaaa gaactcaaga cttttgggaa 720
gttcaattag gaataccaca cccagcagg ttaaaaaaga aaaaatcagt gacagtactg 780
gatgtggggg atgcatattt ttcagttcct ttagatgaag gcttcgggaa atatactgca 840
ttcaccatac ctagtataaa caatgaaaca ccagggatta gatatcaata taatgtgctt 900
ccacagggat ggaaaggatc accagcaata ttccagagta gcatgacaaa aatcttagag 960
cccttttaggg cacgaaatcc aaaaatagtc atctatcaat atatggatga cttgtatgta 1020
gggtctgact tagaaatagg gcatcataga gcaaaaatag aggagttaag agcacatcta 1080
ttaagtggg gattcaccac accagataag aaacatcaga aagaaccccc atttcttttg 1140
atggggtatg aactccatcc tgacaaatgg acagtacagc ctataaagct gccagaaaag 1200
gatagctgga ctgtcaatga tatacagaag ttagtgggaa aattaaactg ggcaagtcag 1260
atttaccag ggattaaagt gaggcaactt tgtaaactcc ttaggggggc caaagcacta 1320
acagacatag taccactaac tgaagaagca gaattagaat tagcagagaa cagggaatt 1380

```



|             |            |             |             |             |            |      |
|-------------|------------|-------------|-------------|-------------|------------|------|
| ctaaaagagc  | cagtacatgg | agtatattat  | gacccatcaa  | aagacttaat  | agctgaaata | 1440 |
| cagaaacagg  | ggcatgacca | atggacatat  | caaatttacc  | aagaaccatt  | caaaaatctg | 1500 |
| aaaacagggg  | agtatgcaaa | aatgaggact  | gctcacacta  | atgatgtaaa  | acagttaaca | 1560 |
| gaggcagtg   | aaaaaatagc | catagaaagc  | atagtaatat  | gggaaagacc  | cctaaattta | 1620 |
| gactacccat  | ccaaaaagaa | acgtgggaga  | catgggtggac | agactattgg  | caggccacct | 1680 |
| ggattcctga  | ttgggagttt | gttaataccc  | ctcccctagt  | aaaattatgg  | taccagctag | 1740 |
| aaaaagaacc  | catagtagga | gcagaaactt  | tctatgtaga  | tggagcagct  | aatagggaaa | 1800 |
| ctaaagtagg  | aaaagcaggg | tatgttactg  | acagaggaag  | gcagaaaatt  | gtttctttta | 1860 |
| ctgaaacaac  | aaatcagaag | actgaattgc  | aagcaattca  | gctagctttg  | caagattcag | 1920 |
| gaacagaagt  | aaacatagta | acagactcac  | agtatgcatt  | aggaatcatt  | caagcacaac | 1980 |
| cagataaaag  | tgaatcagag | ttagtcaacc  | aaataataga  | acaattaata  | aacaaagaaa | 2040 |
| gagtctatct  | gtcatgggta | ccagcacata  | aaggaattgg  | agggaatgaa  | caagtagata | 2100 |
| gattagtaag  | tagtggaatt | aggaaagtac  | tgtttctaga  | tgggatagat  | aaggctcaag | 2160 |
| aagatcatga  | aaagtatcac | agcaattgga  | gagcaatggc  | taatgagttt  | aatctgccac | 2220 |
| ccatagtagc  | aaaagaaata | gtagctagct  | gtgataaatg  | ccagctaaaa  | ggggaagcca | 2280 |
| tgcattggaca | agtagaccgt | agcccagggg  | tatggcaatt  | agattgtaca  | catctagaag | 2340 |
| gaaaaatcat  | cctggtagca | gtccatgtag  | ccagtggcta  | catagaagca  | gaggttatcc | 2400 |
| cagcagaaac  | aggacaagaa | acagcatact  | atatactaaa  | attagcagga  | agatggccag | 2460 |
| tcaaagtaat  | acatacagac | aatggtagta  | atttcaccag  | tgctgcagtt  | aaggcagcct | 2520 |
| gttggtgggc  | aggtatccaa | caggaatttg  | gaattcccta  | caatcccaa   | agccagggag | 2580 |
| tagtagaatc  | catgaataaa | gaattaaaga  | aaattatagg  | gcaggtaaga  | gaacaagctg | 2640 |
| agcaccttaa  | gacagcagta | caaattggcag | tattcattca  | caattttaaa  | agaaaagggg | 2700 |
| ggattggggg  | gtacagtgca | ggggaaagaa  | caatagacat  | aatagcaaca  | gacatacaaa | 2760 |
| ctaaagaatt  | acaaaaccaa | attacaaaaa  | ttcaaaattt  | tcgggtttat  | tacagagaca | 2820 |
| gcagagaccc  | catttggaag | ggaccagcca  | aactgctctg  | gaaagggtgaa | ggggcagtag | 2880 |
| taatacaaga  | taatagtgc  | ataaaggtag  | tgccaaggag  | gaaagcaaaa  | attattaggg | 2940 |
| attatggaaa  | acagatggca | ggtgctgatt  | gtgtggcagg  | tagacaggat  | gaggatcaga | 3000 |
| acatggaata  | g          |             |             |             |            | 3011 |

<210> 102

<211> 579

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94IN476.104; gene=vif

<400> 102

|            |             |            |             |            |            |     |
|------------|-------------|------------|-------------|------------|------------|-----|
| atggaaaaca | gatggcaggt  | gctgattgtg | tggcaggtag  | acaggatgag | gatcagaaca | 60  |
| tggaatagtt | tagtaaaaca  | ccatatgtat | gtttcaagaa  | gagctagtgg | atggttttac | 120 |
| agacatcatt | atgaaagcag  | acatccaaaa | gtaagtgcag  | aagtacacat | cccattagga | 180 |
| gatgctagat | tagtaataaa  | aacatatttg | ggttttacaaa | caggagaaag | agattggcat | 240 |
| ttgggtcatg | gcgtctccat  | agaatggaga | ttgggaagat  | atagcacaca | agtagaacct | 300 |
| ggcctggcag | accagcta    | ccatatgc   | tattttgatt  | gttttgcaga | ctctgccata | 360 |
| agaaaagcca | tattaggaca  | catagttatt | tctaggtgtg  | attatcaagc | aggacataat | 420 |
| aaggtaggat | ctctacaata  | cttggcactg | acagcattga  | taaaaccaa  | aaagagaaag | 480 |
| ccacctctgc | ctagtgttaa  | gaaattagta | gaggatagat  | ggaacaatcc | ccagaagacc | 540 |
| agggaccaca | gaggggaacca | tacaatgaat | ggacactag   |            |            | 579 |

<210> 103  
<211> 291  
<212> DNA  
<213> Human immunodeficiency virus type 1

<220>  
<223> isolate=94IN476.104; gene=vpr

<400> 103  
atggaacaat cccagaaga ccagggacca cagaggggaac catacaatga atggacacta 60  
gagcttctag aggaactcaa gcaggaagct gtcagacact ttcctagacc ttagcttcat 120  
agcttaggac aatatatcta tgaaacatat ggggatgctt ggacaggagt cgaagcttta 180  
ataagaacac tgcaacaatt actgtttatt catttcagaa ttgggtgccg gcatagcaga 240  
ataggcattt tacaacggag aagagcaaga aatggagcca gtagatccta a 291

<210> 104  
<211> 2633  
<212> DNA  
<213> Human immunodeficiency virus type 1

<220>  
<223> isolate=94IN476.104; gene=tat

<400> 104  
atggagccag tagatcctaa cctagagccc tggaaccatc caggaagtca gcctaaaact 60  
gcttgtaata catgctattg taaacactgt agctaccatt gtctagtttg ctttcagaca 120  
aaaggcttag gcatttccta tggcaggaag aagcggagac agcgacgcag cgctcctcca 180  
agcagtgagg atcatcaaaa tcttatatca aagcagtaag tatatgtaat ggtgaattta 240  
ttagaaaagag tagattatag attaggagta ggagcattaa tagtagcatt aatcttagca 300  
ataatttgtg ggaccatagc atatctagaa tataggaaat tgttaagaca aagaaaaata 360  
aacaggttaa ttgaaagaat tagggaaaga gtagaagaca gtggcaatga gagtgagggg 420  
gatactgagg aattgtcaac actggtggat atggggaatc ttaggctttt ggatgctaata 480  
gatttataat gtagtaggga acttgtgggt cacagtctat tatggggtag ctgtgtggaa 540  
agaagcaaaa actactttat tctgtgcatc agatgctaaa gcttatgaga aggaggtgca 600  
taatattctg gctacacatg cctgtgtacc cacagacccc aaccacaag agatggattt 660  
agtaaagtga acagaaaatt ttaacatgtg gaaaaatgac atgggtggatc agatgcatga 720  
ggatgtaatc agtttatggg atcaaagcct aaagccatgt gtaaagttga cccactctg 780  
tgtcacttta aactgtagta aggttaccaa taatgtctact tacaataata ctgatgatat 840  
aaaaaattgc tcttttaatg caaccacaga aataagagac aagaaacgca aagagtatgc 900  
actgttttat agactcgata tagtaccact aaatgagaat aagaacagct ctagtaacta 960  
tagtgagtac atattaataa attgtaatac ctcaaccata acacaagcct gtccaaagggt 1020  
ctcttttgac ccaattccta tacattattg tgctccagct ggttttgcga ttctaaagtg 1080  
taaagatgag acattcaatg ggacaggacc atgcaaggag gtcagtacag tacaatgtac 1140  
acatggaatt aagccagtgg tatcaactca actactgtta aatggtagca cagcagaaaa 1200  
agagataata actagatctg aaaatataac agacaatgca aaaactataa tagtacatct 1260  
taatgaatcc ataaaaattg tatgtacaag acccaacaat aacacaagaa aaagtataag 1320  
gatagggcca ggacaagcat tctatgcaac aaacggcata ataggagaca taagacaagc 1380

```

acattgtaac attagtgaat ctaactggac taaaacttta caagaggtag gaaaaaaatt 1440
agcaaagcac ttccctaata aaacaataag tttcaaccaa tcctcaggag gggacctaga 1500
aattgtaaca catagcttta attgtggagg agaattcttt tattgtaata catcaagact 1560
gtttaacggg acatacaatg gtacagacat gcctacatac aatgggtacaa attccagttc 1620
agacatcatc atgcttccat gcagaataag gcaatttata aacatttggc agaaggtagg 1680
acgagcaatg tatgcccctc ccattgaagg aaacataaca tgtgaatcaa atatcacagg 1740
actactatta gtacgtgatg gaggcgacac aaatagtagc acagagatat tcagacctgg 1800
aggaggagat atgagggaca attggagaag tgaattatat aaatataaag tggtagaaat 1860
taagccatta ggaatagcac ctactgaagc aaaaaggaga gtggtggaga gagaaaaaag 1920
agcagtggga ataggagctg tgttccttgg gttcttggga gtagcaggaa gcactatggg 1980
cgcggcgctc atgacgctga cggtagcagg cagacaattg ttgtctggta tagtgcaaca 2040
gcaaagcaat ttgctgaagg ctatagaggc gcaacagcat atgttgcaac tcacagtctg 2100
gggcattaag cagctccaga caagagtctt ggctatagag agatacctaa aggatcaaca 2160
gctcctaggg atttggggct gctctggaaa agtcatctgc cccactgctg tgccttggaa 2220
ctccagctgg agtaataaat caaaagatga tatttggaa aacatgacct ggatgcagtg 2280
ggataaagag attagtaatt acacaaacac aatataccgg ttgcttgaag aatcgcaaat 2340
ccagcaggaa caaaatggaa aagatttatt agcattggac agttggcaaa atctgtggaa 2400
ttgggttagc ataacaaaat ggctgtggta tataaaaata ttcataatta tagtaggagg 2460
cttgataggt ttgagaataa tttttgctgt gctatctata gtaaataagag ttaggcaggg 2520
atactcacct ttgtcgttgc agacccttac cccagaccgc agggaaccgc acaggctcag 2580
aggaatcgaa gaagaagggt gagagcaaga caaagacaga tccattcgat tag 2633

```

<210> 105

<211> 2651

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94IN476.104; gene=rev

<400> 105

```

atggcaggaa gaagcggaga cagcgacgca gcgctcctcc aagcagtgag gatcatcaaa 60
atcttatatc aaagcagtaa gtatatgtaa tgggtgaattt attagaaaga gtagattata 120
gattaggagt aggagcatta atagtagcat taatcttagc aataattgtg tggaccatag 180
catatctaga atataggaaa ttgttaagac aaagaaaaat aaacaggtta attgaaagaa 240
ttagggaaaag agtagaagac agtggaatg agagtgagg ggatactgag gaattgtcaa 300
cactgggtgga tatggggaat cttaggcttt tggatgctaa tgatttataa tgtagtaggg 360
aacttggtgg tcacagtcta ttatggggta cctgtgtgga aagaagcaaa aactacttta 420
ttctgtgcat cagatgctaa agcttatgag aaggaggtgc ataatatctg ggctacacat 480
gctgtgttac ccacagacc caaccacaa gagatggatt tagtaaatgt aacagaaaat 540
tttaacatgt ggaaaaatga catggtggat cagatgcatg aggatgtaat cagtttatgg 600
gatcaaagcc taaagccatg tgtaaagttg accccactct gtgtcacttt aaactgtagt 660
aaggttacca ataatgctac ttacaataat actgatgata taaaaaattg ctcttttaaat 720
gcaaccacag aaataagaga caagaaacgc aaagagtatg cactgtttta tagactcgat 780
atagtaccac taaatgagaa taagaacagc tctagtaact atagtgagta catattaata 840
aattgtaata cctcaaccat aacacaagcc tgtccaaagg tctcttttga cccaattcct 900
atacattatt gtgctccagc tggtttttgc attctaaagt gtaaagatga gacattcaat 960
gggacaggac catgcaagga ggtcagtaca gtacaatgta cacatggaat taagccagtg 1020

```

```

gtatcaactc aactactggt aaatggtagc acagcagaaa aagagataat aactagatct 1080
gaaaatataa cagacaatgc aaaaactata atagtacatc ttaatgaatc cataaaaaatt 1140
gtatgtacaa gacccaacaa taacacaaga aaaagtataa ggatagggcc aggacaagca 1200
ttctatgcaa caaacggcat aataggagac ataagacaag cacattgtaa cattagttaa 1260
tctaactgga ctaaaacttt acaagaggta ggaaaaaaat tagcaaagca cttccctaatt 1320
aaaacaataa gtttcaacca atcctcagga ggggacctag aaattgtaac acatagcttt 1380
aattgtggag gagaattctt ttattgtaat acatcaagac tgtttaacgg tacatacaat 1440
ggtacagaca tgcctacata caatggtaca aattccagtt cagacatcat catgcttcca 1500
tgcagaataa ggcaatttat aaacatttgg cagaaggtag gacgagcaat gtatgccctt 1560
cccattgaag gaaacataac atgtgaatca aatatcacag gactactatt agtacgtgat 1620
ggaggcgaca caaatagtag cacagagata ttcagacctg gaggaggaga tatgaggggac 1680
aattggagaa gtgaattata taaatataaa gtggtagaaa ttaagccatt aggaatagca 1740
cctactgaag caaaaaggag agtgggtggag agagaaaaaa gagcagtggg aataggagct 1800
gtgttccttg ggttcttggg agtagcagga agcactatgg gcgcggcgtc aatgacgctg 1860
acggtacagg ccagacaatt gttgtctggt atagtgcac agcaaagcaa tttgctgaag 1920
gctatagagg cgcaacagca tatgttgcaa ctcacagtct ggggcattaa gcagctccag 1980
acaagagtct tggctataga gagataccta aaggatcaac agctcctagg gatttggggc 2040
tgctctggaa aagtcactct cccactgct gtgccttggg actccagctg gagtaataaa 2100
tcaaaagatg atatttgaa taacatgacc tggatgcagt gggataaaga gattagtaat 2160
tacacaaaca caatataccg gttgcttgaa gaatcgcaaa tccagcagga acaaaatgga 2220
aaagatttat tagcattgga cagttggcaa aatctgtgga attgggttag cataacaaaa 2280
tggctgtggt atataaaaat attcataatt atagtaggag gcttgatagg tttgagaata 2340
atTTTTtctg tgctatctat agtaaataga gttaggcagg gatactcacc tttgtcgttg 2400
cagaccctta cccagaccc gagggaaacc gacaggctca gaggaatcga agaagaagg 2460
ggagagcaag acaaagacag atccattcga ttagtgaacg gattcttagc acttgctgg 2520
gacgatctac ggagcctgtg cctcttcagt tgccaccgat tgagagactt catattgggt 2580
gcagcgagag cggtggaact tctgggacgc agcagtctca ggggactaca gaggggggtg 2640
gaagccctta a 2651

```

<210> 106

<211> 261

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94IN476.104; gene=vpu

<400> 106

```

atggtgaatt tattagaaag agtagattat agattaggag taggagcatt aatagtagca 60
ttaatcttag caataattgt gtggaccata gcatatctag aatataggaa attgttaaga 120
caaagaaaaa taacacaggt aattgaaaga attagggaaa gagtagaaga cagtggcaat 180
gagagtgagg gggatactga ggaattgtca acactggtgg atatggggaa tcttaggctt 240
ttggatgcta atgatttata a 261

```

<210> 107

<211> 2574

<212> DNA

<213> Human immunodeficiency virus type 1

<220>

<223> isolate=94IN476.104; gene=env

<400> 107

```
atgagagtga gggggatact gaggaattgt caacactggt ggatatgggg aatccttaggc 60
ttttggatgc taatgattta taatgtagta gggaacttgt gggtcacagt ctattatggg 120
gtacctgtgt ggaaagaagc aaaaactact ttattctgtg catcagatgc taaagcttat 180
gagaaggagg tgcataatat ctgggctaca catgcctgtg taccacaga cccaaccca 240
caagagatgg atttagtaaa tgtaacagaa aattttaaca tgtggaaaaa tgacatgggtg 300
gatcagatgc atgaggatgt aatcagttta tgggatcaaa gcctaaagcc atgtgtaaag 360
ttgacccccac tctgtgtcac tttaaactgt agtaagggtta ccaataatgc tacttacaat 420
aatactgatg atataaaaaa ttgctctttt aatgcaacca cagaaataag agacaagaaa 480
cgcaagaggt atgcaactgt ttatagactc gatatagtac cactaaatga gaataagaac 540
agctctagta actatagtga gtacatatta ataaattgta atacctcaac cataacacaa 600
gcctgtccaa aggtctcttt tgacccaatt cctatacatt attgtgctcc agctgggttt 660
gcgattctaa agtgtaaaga tgagacattc aatgggacag gaccatgcaa ggaggtcagt 720
acagtacaat gtacacatgg aattaagcca gtggtatcaa ctcaactact gttaaatggt 780
agcacagcag aaaaagagat aataactaga tctgaaaata taacagacaa tgcaaaaact 840
ataatagtac atcttaatga atccataaaa attgtatgta caagaccaa caataacaca 900
agaaaaagta taaggatagg gccaggacaa gcattctatg caacaaacgg cataatagga 960
gacataagac aagcacattg taacattagt gaatctaact ggactaaaac tttacaagag 1020
gtaggaaaaa aattagcaaa gcacttcctt aataaaacaa taagtttcaa ccaatcctca 1080
ggaggggacc tagaaattgt aacacatagc tttaattgtg gaggagaatt cttttattgt 1140
aatacatcaa gactgtttta cgggtacatac aatgggtacag acatgcctac atacaatggt 1200
acaaattcca gttcagacat catcatgctt ccatgcagaa taaggcaatt tataaacatt 1260
tggcagaagg taggacgagc aatgtatgcc cctcccattg aaggaaacat aacatgtgaa 1320
tcaaatatca caggactact attagtacgt gatggaggcg acacaaatag tagcacagag 1380
atattcagac ctggaggagg agatatgagg gacaattgga gaagtgaatt atataaatat 1440
aaagtggtag aaattaagcc attaggaata gcacctactg aagcaaaaag gagagtgggtg 1500
gagagagaaa aaagagcagt gggaatagga gctgtgttcc ttgggttctt gggagtagca 1560
ggaagcacta tgggcgcggc gtcaatgacg ctgacggtac aggccagaca attgttgtct 1620
ggtatagtgc aacagcaaag caatttgctg aaggctatag aggcgcaaca gcatatgttg 1680
caactcacag tctggggcat taagcagctc cagacaagag tcttggctat agagagatac 1740
ctaaaggatc aacagctcct agggatttgg ggctgctctg gaaaagtcac ctgccccact 1800
gctgtgcctt ggaactccag ctggagtaat aaatcaaaag atgatatattg gaataacatg 1860
acctggatgc agtgggataa agagattagt aattacacaa acacaatata ccggttgctt 1920
gaagaatcgc aaatccagca ggaacaaaat ggaaaagatt tattagcatt ggacagttgg 1980
caaaatctgt ggaattgggt tagcataaca aaatggctgt ggtatataaa aatattcata 2040
attatagtag gaggcttgat aggtttgaga ataatttttg ctgtgctatc tatagtaaat 2100
agagttaggc agggatactc acctttgtcg ttgcagaccc ttaccccaga cccgagggaa 2160
cccagacagg tcagaggaat cgaagaagaa ggtggagagc aagacaaaga cagatccatt 2220
cgattagtga acgattctt agcacttgcc tgggacgatc tacggagcct gtgcctcttc 2280
agttgccacc gattgagaga cttcatattg gttgcagcga gagcgggtgga acttctggga 2340
cgcagcagtc tcaggggact acagaggggg tgggaagccc ttaaataatct ggggaagtctt 2400
gtgcagtatt ggggtctgga actaaaaaag agtgctatta gtctgcttga taccatagca 2460
ataacaatag ctgaggggaa agataggatt atagaattta cacaagaat ttgcagagct 2520
atccgcaaca tacctagaag aataagacag ggttttgaag cagctttgct ataa 2574
```

<210> 108  
<211> 624  
<212> DNA  
<213> Human immunodeficiency virus type 1

<220>  
<223> isolate=94IN476.104; gene=nef

<400> 108  
atggggagca agatgtcaaa aagcagaata gttggatggc ctgaggtaag agaaagaatg 60  
aggagaactg agccagcagc agagggagta ggagcagcat ctcaagactt agctaaacat 120  
ggagcactta caaccageaa cacaccaagc aataatgctg ctggtgcctg gctgcaagcg 180  
caagaggagg aagaagaagt aggctttcca gtcagacctc aggtgccttt aagaccaatg 240  
acttataaag gagcattcga tctcgcttcc tttttaaaag aaaagggggg actggatggg 300  
ttaatttact ctaagaaaag gcatgaaatc cttgatttat gggtttataa cacacaaggc 360  
tacttcctg attggcaaaa ctacacacca ggaccagggg tcagatatcc actgaccttt 420  
ggatggtgct acaagctagt accagttgac ccaagtgtag tagaagaggc caacaaagga 480  
gaaaacaact gtttgctaca ccctatgagc caacatggaa tggatgatga agatggagaa 540  
gtattaaagt ggcagtttga cagcagccta gcacgcagac acatagcccg cgagctacat 600  
ccggagtatt acaaagactg ctga 624

Full  
B1  
cont